UNITED STATES ARMY APRIL 1974

AVIATION DIGEST

stamp *n* **1 :** a device or instrument for stamping **2 :** the impression or mark made by stamping or imprinting **3 a :** a distinctive character, indication, or mark **b :** a lasting imprint **4 :** the act of stamping **5 :** a stamped or printed paper affixed in evidence that a tax has been paid; *also* : POSTAGE STAMP

¹stam·pede \stam-'pēd\ *n* [AmerSp *estampida*, fr. Sp, crash, fr. *estampar* to stamp, of Gmc origin; akin to OHG *stampfōn* to stamp] **1 :** a wild headlong rush or flight of frightened animals **2 :** a mass movement of people

²stampede *vt* **1 :** to cause (a herd) to run away in headlong panic **2 :** to cause (a group of people) to act on impulse : to flee headlong in panic

stamp·er \'stam-pər, 'stämp-\ *n* : one that stamps; as **a :** a worker or machine that performs a stamping operation **b :** an implement for stamping **c :** a machine of various stamping machines

stamping ground \'stamp-, 'stämp-, 'stȯmp-\ *n* : a favorite or habitual resort

stamp mill \'stamp-\ *or* **stamping mill** \'stam-piŋ-\ *n* : a mill in which ore is crushed with stamps; *also* : a machine for stamping ore — called also *quartz battery*

stamp tax *n* : a tax collected by means of a stamp purchased and affixed (as to a deck of playing cards); *specif* : such a tax on a document (as a deed or promissory note) — called also *stamp duty*

stance \'stan(t)s\ *n* [MF *estance* position, posture, stay, fr. (assumed) VL *stantia*, fr. L *stant-*, *stans*, prp. of *stare* to stand] **1** *chiefly Scot* **a :** STATION **b :** SITE **2 a :** a mode of standing or being placed : POSTURE **b :** intellectual or emotional attitude **3 a :** the position of the feet of a golfer or batter preparatory to making a swing **b :** the position of both body and feet from which an athlete starts or operates

¹stanch \'stȯnch, 'stänch\ *vt* [ME *staunchen*, fr. MF *estancher*, fr. (assumed) VL *stanticare*, fr. L *stant-*, *stans*, prp.] **1 :** to check or stop the flowing of; *also* : to stop the flow of blood from (a wound) **2** *archaic* : ALLAY, EXTINGUISH **3 a :** to stop or check in its course **b :** to make watertight — **stanch·er** *n*

²stanch *var of* STAUNCH

¹stan·chion \'stan-chən, *2 is often* -chəl\ *n* [ME *stanchon*, fr. MF *estanchon*, fr. OF, aug. of *estance* stay, prop] **1 :** an upright bar, post, or support **2 :** a device that fits loosely around a cow's neck and limits forward and backward motion (as in a stall)

²stanchion *vt* **stan·chion·ing** \'stanch-(ə-)niŋ, -(ə-)liŋ\ **1 a :** to provide with stanchions **b :** to support or brace with or as if with a stanchion **2 :** to secure (as a cow) by a stanchion

¹stand \'stand\ *vb* **stood** \'stůd\ **stand·ing** [ME *standen*, fr. OE *standan*; akin to OHG *stantan*, *stān* to stand, L *stare*, Gk *histanai* to cause to stand, set, *histasthai* to stand, be standing] *vi* **1 a :** to support oneself on the feet in an erect position **b :** to be a (specified) height when fully erect **c :** to rise to an erect position **2 a :** to take up or maintain a specified position or posture ⟨~ aside⟩ **b :** to maintain one's position **3 a :** to be firm and steadfast in support or opposition **b :** to be in a particular state or situation ⟨~*s* accused⟩ **4 :** to hold a course at sea **5** *obs* : HESITATE **6 :** to have or maintain a relative position in or as if in a graded scale ⟨~*s* first in his class⟩ **7** *chiefly Brit* : to be a candidate : RUN **8 a :** to rest or remain upright on a base or lower end **b :** to occupy a place or location **9 a :** to remain stationary or inactive ⟨the car *stood* in the garage for a week⟩ ⟨rainwater ~*ing* in stagnant pools⟩ **b :** to gather slowly and remain ⟨tears ~*ing* in her eyes⟩ **10 :** AGREE, ACCORD — used chiefly in the expression *it stands to reason* **11 a :** to exist in a definite written or printed form ⟨copy a passage exactly as it ~*s*⟩ **b :** to remain valid or efficacious ⟨the order given last week still ~*s*⟩ **12** *of a male animal* : to be available as a sire — used esp. of horses ~ *vt* **1 a :** to endure or undergo successfully **b :** TOLERATE, BEAR **2 :** to remain firm in the face of **3 :** to submit to ⟨~ trial⟩ **4 a :** to perform the duty of ⟨~ guard⟩ **b :** to participate in (a military formation) **5 :** to pay for ⟨~ drinks⟩ **6 :** to set upright **syn** see BEAR — **stand·er** *n* — **stand a chance :** to have a chance — **stand by :** to remain loyal or faithful to : DEFEND — **stand for 1 :** to be a symbol for : REPRESENT **2 :** to put up with : PERMIT — **stand on 1 :** to depend upon **2 :** to insist on — **stand one's ground :** to maintain one's position — **stand pat 1 :** to play one's hand as dealt in draw poker without drawing **2 :** to oppose or resist change

²stand *n* **1 :** an act of stopping or staying in one place **2 a :** a halt for defense or resistance **b :** a defensive effort of some duration or degree of success ⟨goal-line ~⟩ **c** (1) : a stop made to give a performance (2) : a town where such a stop is made **3 a :** a place or post where one stands **b :** a position esp. with respect to an issue **4 a :** the place taken by a witness for testifying in court **b :** a section of the tiered seats for spectators of an outdoor sport or spectacle; *also* : the occupants of such seats — usu. used in pl. **c :** a raised platform serving as a point of vantage (as for a speaker) **5 a :** a small often open-air structure for a small retail business **b :** a site fit for business opportunity **6 :** a place where a passenger vehicle stops or parks **7 :** ¹HIVE 2 **8 :** a frame on or in which something may be placed for support **9 :** a group of plants growing in a continuous area **10 :** a standing posture

¹stan·dard \'stan-dərd\ *n* [ME, fr. MF *estandard* rallying point, standard, of Gmc origin; akin to OE *standan* to stand and to OE *ord* point — more at ODD] **1 :** a conspicuous object (as a banner) formerly used at the top of a pole to mark a rallying point esp. in battle or to serve as an emblem **2 a :** a long narrow tapering flag that is personal to an individual or corporation and bears heraldic devices **b :** the personal flag of the head of a state or of a member by authority, custom, or general consent as a model or exam : CRITERION **4 :** something set up and established by authori as a rule for the measure of quantity, weight, extent, value, quality **5 a :** the fineness and legally fixed weight of the me used in coins **b :** the basis of value in a monetary system **6 :** structure built for or serving as a base or support **7 :** a plant grow with an erect main stem so that it forms or resembles a tree; *al* : a fruit tree grafted on a stock that does not induce dwarfi [illegible] large posterior petal of [illegible] the three inner [illegible] and incurved petals of an iris

SYN STANDARD, CRITERION, GAUGE, [illegible], TOUCHSTON mean [illegible] to any [illegible] by; CRITERION [illegible] whether [illegible] to a [illegible] depth, diameter) or figuratively a particular quality or aspec YARDSTICK is an informal substitute for CRITERION that sugges quantity more often than quality; TOUCHSTONE suggests a simp test of the authenticity or value of something intangible

²standard *adj* **1 a :** constituting or conforming to a standa established by law or custom ⟨~ weight⟩ ⟨~ silver⟩ ⟨window of width⟩ **b :** sound and usable but of inferior quality ⟨~ bee **2 :** regularly and widely used **3 :** having recognized and perm nent value ⟨~ reference work⟩ **4 :** substantially uniform a well-established by usage in the speech and writing of the educate and widely recognized as acceptable

stan·dard–bear·er \-,bar-ər, -,ber-\ *n* **1 :** one that bears a standa or banner **2 :** the leader of an organization or movement

stan·dard-bred \-,bred\ *n* : any of an American breed of lig trotting and pacing horses bred for speed and noted for enduran

standard candle *n* : CANDLE 3

standard deviation *n* : the square root of the arithmetic mean the squares of the deviation from the arithmetic mean of a frequen distribution

Standard English *n* : the English that with respect to spellin grammar, pronunciation, and vocabulary is substantially unifor though not devoid of regional differences, that is well establish by usage in the formal and informal speech and writing of the ed cated, and that is widely recognized as acceptable wherever Engli is spoken and understood

standard error *n* : the standard deviation of a sample of a norm frequency distribution that equals the standard deviation of t distribution divided by the square root of the size of the sample

standard gauge *n* : a railroad gauge of 4 feet 8½ inches

stan·dard·iza·tion \,stan-dərd-ə-'zā-shən\ *n* : the act, proces or result of standardizing

stan-dard-iza-tion (Army aviation): The uniform application of established and tested procedures and techniques to achieve a high level of excellence and professionalism in the operation and employment of Army aircraft. The level is achieved through the medium of standard publications and training literature, a disciplined instructor pilot force, frequent tests, flight checks and command supervision. Standardization encompasses aviator cockpit performance, tactics, maintenance, air traffic control and safety

stan·dard·ize \'stan-dər-,dīz\ *vt* **1 :** to compare with a standa **2 :** to bring into conformity with a standard

standard of living *or* **standard of life :** a minimum of necessiti comforts, or luxuries that is essential to maintaining a person group in customary or proper status or circumstances

standard position *n* : the position of an angle with its vertex at t origin of a rectangular coordinate system and its initial side coi ciding with the positive x-axis

standard time *n* : the time of a region or country that is establish by law or general usage as civil time; *specif* : the mean solar ti of a meridian that is a multiple of 15 arbitrarily applied to a loc

Stan·ford–Bi·net test \,stan-fərd-bi-'nā-\ *or* **Stanford revision** [*Stanford* University, Calif.] : an intelligence test prepared Stanford University as a revision of the Binet-Simon scale a commonly employed with children

¹stang \'staŋ\ *vt* [ME *stangen*, fr. ON *stanga* to prick; akin to O *stinga* to sting] *chiefly Scot* : STING

²stang *n*, *chiefly Scot* : PANG

stan·hope \'stan-əp\ *n* [Fitzroy *Stanhope* †1864 Brit clergyma : a gig, buggy, or light phaeton typically having a high seat a closed back

¹stank *past of* STINK

²stank \'staŋk\ *n* [ME, fr. OF *estanc*] **1** *dial Brit* **a :** POND, PO **b :** a ditch containing water **2** *Brit* : a small dam : WEIR

stan·na·ry \'stan-ə-rē\ *n* [ML *stannaria* tin mine, fr. LL *stannu* tin] : one of the regions in England containing tinworks — u used in pl.

stan·nic \'stan-ik\ *adj* [prob. fr. F *stannique*, fr. LL *stannum* t fr. L, an alloy of silver and lead, prob. of Celt origin; akin Corn *stēn* tin] : of, relating to, or containing tin esp. with a valen of four

stan·nite [illegible]

UNITED STATES ARMY AVIATION DIGEST

APRIL 1974 VOLUME 20 NUMBER 4

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VANGUARD OF FREEDOM
BICENTENNIAL 1775-1975
UNITED STATES ARMY

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ABOUT THE COVER

What is standardization? The definition on the cover sets the theme for this issue—Army aviation flight standardization

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine and other related data.

The DIGEST is an official Department of the Army periodical published monthly under the supervision of the Commandant, U. S. Army Aviation School. Views expressed herein are not necessarily those of the Department of the Army or the U. S. Army Aviation School. Photos are U. S. Army unless otherwise specified. Material may be reprinted provided credit is given to the DIGEST and to the author, unless otherwise indicated.

Articles, photos, and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, U. S. Army Aviation Digest, Fort Rucker, AL 36360.

This publication has been approved by Headquarters Department of the Army, 1 September 1973.

Active Army units receive distribution under the pinpoint distribution system as outlined in AR 310-1. Complete DA Form 12-5 and send directly to CO, AG Publications Center, 2800 Eastern Boulevard, Baltimore, MD 21220. For any change in distribution requirements, initiate a revised DA Form 12-5.

National Guard and Army Reserve units under pinpoint distribution also should submit DA Form 12-5. Other National Guard units should submit requests through their state adjutants general.

Those not eligible for official distribution or who desire personal copies of the DIGEST can order the magazine from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Annual subscription rates are $13.40 domestic and $16.75 overseas. Single copies are $1.20.

MENTION THE Army Aviation Standardization Program to aviation people and immediately they think of autorotations, 2-minute turns and other maneuvers in the skies at the United States Army Aviation Center. This is only part of the picture. See what Webster has to say: "bring into conformity with a standard." The word "standard" stands out. In other words, the standardization program means standard as a level to achieve—and a standard as an acceptable way to do things. But, even more germane, and the most important aspect, is that the standardization program applies worldwide—not only to aviators but also to crewchiefs, mechanics, safety officers, flight surgeons—everyone connected with Army aviation.

A lot of people tend to back off from flight standardization. The word itself seems to turn them off. Perhaps that's because they've had some bad experiences in the past with local standardization programs. Or, often they just do not understand standardization . . . and then there's a natural tendency to shun it. But, we must turn this attitude around! Army aviation no longer consists of a couple of L-4 liaison airplanes in an Artillery battalion. Today, complex Army aircraft have moved to center stage where the ground combat forces depend heavily on them for mobility and firepower. This means we must be combat-ready and effective—day or night, rain or shine.

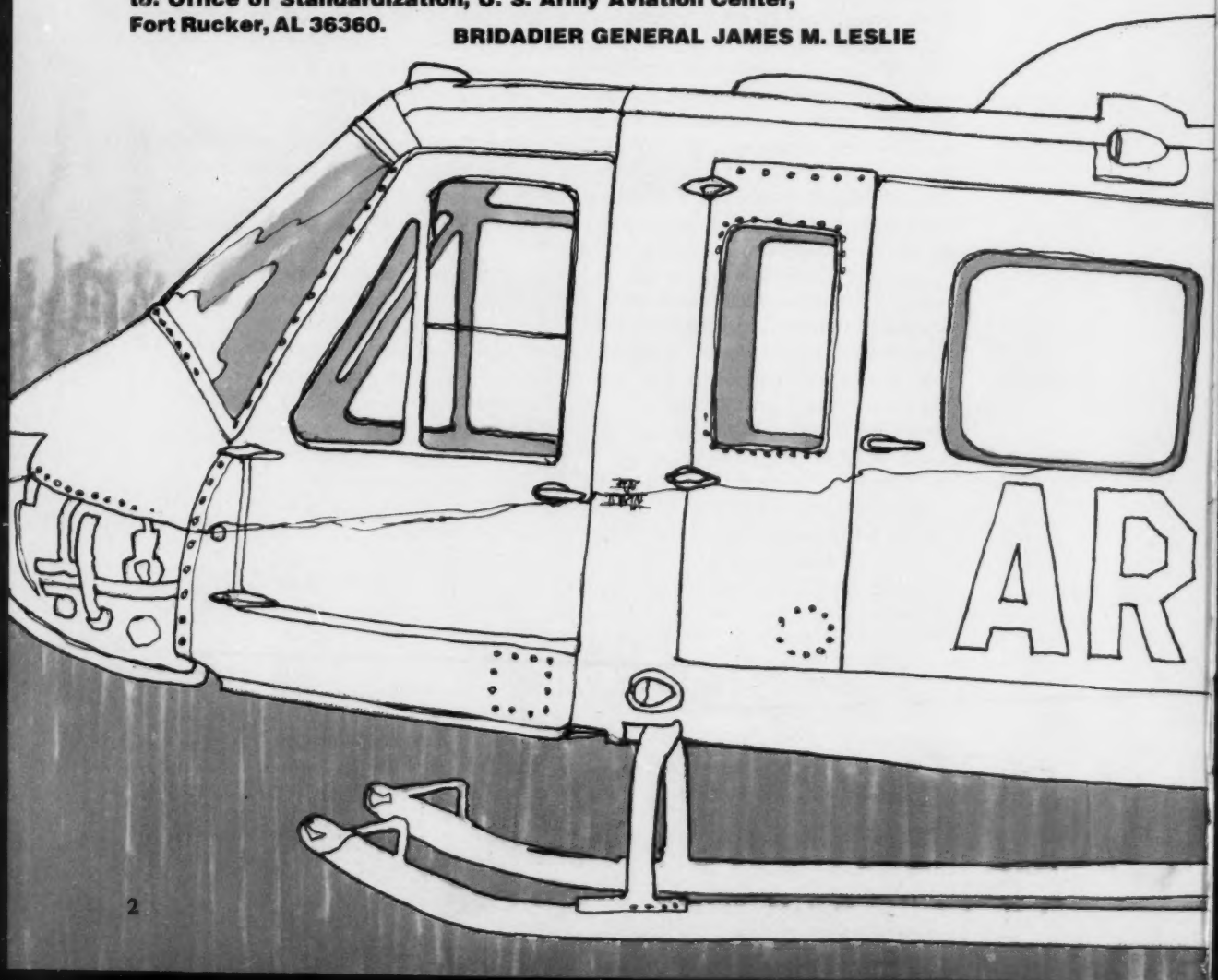
Such a situation cries out for a professional standardization program that cuts across all lines . . . one that encompasses training, safety, maintenance, tactics, aviation medicine, logistics and every other facet of the ground combat operation. Such a flight standardization program has been worked out and in effect for about a year in Army aviation. If it's new to you, don't back away from it. It's the new way of life—professional life. So let's join it. Several articles in this issue of the DIGEST are intended to help acquaint you with the significance of the emerging Army-wide flight standardization program. Read these articles carefully and when you come to grips with standardization remember that you are on a two-way street. The flow of information goes out easily enough, but it's a little more difficult to get the troops in the Arctic, Asia, the tropics, the deserts . . . everywhere . . . to complete the cycle and start the flow of information back. Your opinions and recommendations are valued and needed to make the standardization program fully effective. Send them to: Office of Standardization, U. S. Army Aviation Center, Fort Rucker, AL 36360.

MAJOR GENERAL WILLIAM J. MADDOX, JR.

THERE ARE TWO "laboratories" in which Army-wide flight standardization can be developed to its fullest potential. One includes Army aviation's technicians in the field; the other involves instruction in the student area. Standardization in both of these "labs" must be compatible.

Today, Army aviation encompasses many narrow specialties, all of which Army aviators and other specialists must have a handle on. The instructors depend on standardization to ensure that their students learn the nature and intent of these various specialties as they relate to other facets of Army aviation. This knowledge must thread its way unbroken into the field. There, Soldiers must use flight standardization to guard against modifications to procedures which are based on personal variations promulgated without test and trial. At the same time the technicians in the "field lab" always will be able to develop improved procedures. But these ideas will only strengthen the Army-wide Flight Standardization Program if they are shared. Your ideas and recommendations should be sent to: Office of Standardization, U. S. Army Aviation Center, Fort Rucker, AL 36360.

BRIDADIER GENERAL JAMES M. LESLIE



Flight Standardization... Where Does It Begin?

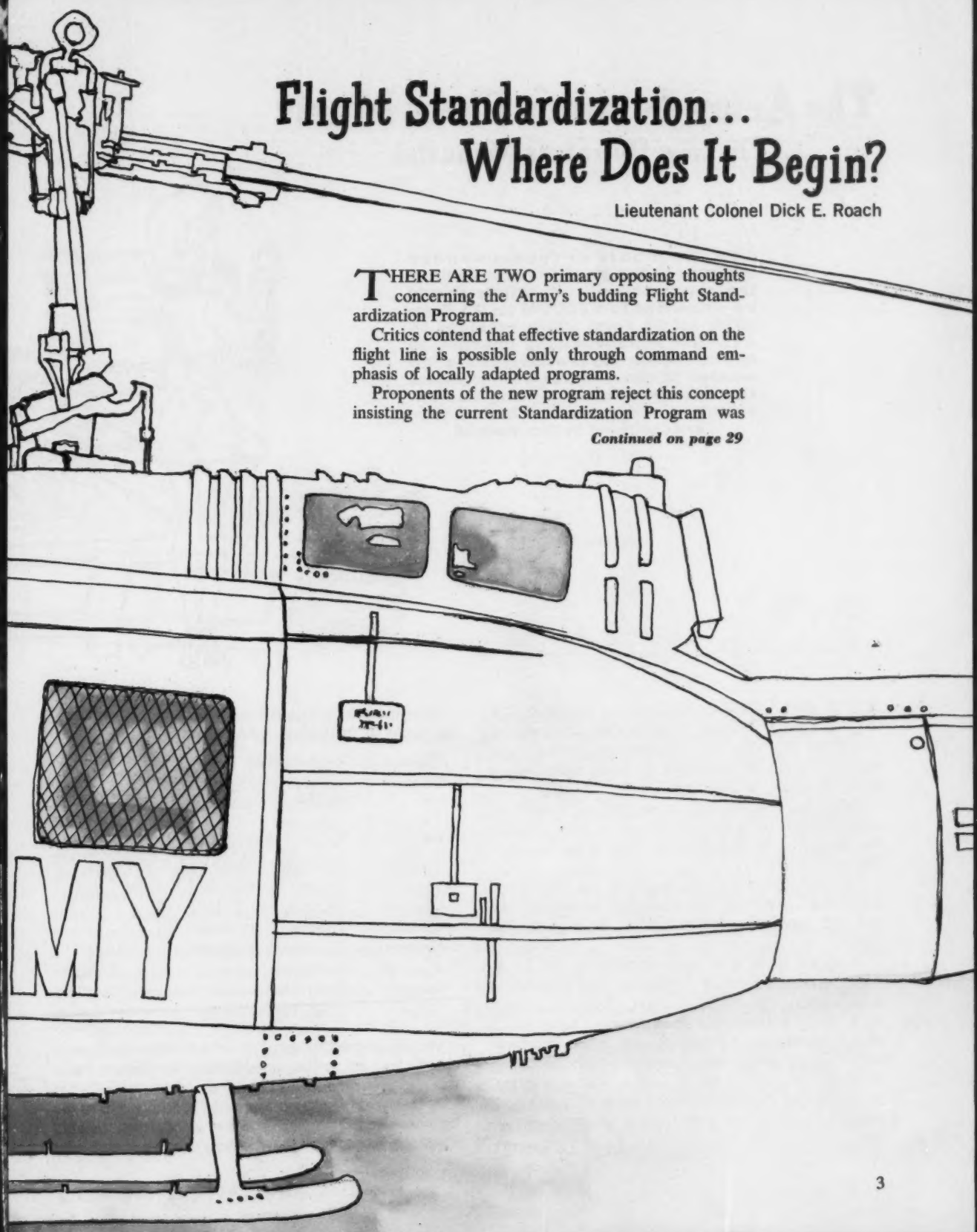
Lieutenant Colonel Dick E. Roach

THERE ARE TWO primary opposing thoughts concerning the Army's budding Flight Standardization Program.

Critics contend that effective standardization on the flight line is possible only through command emphasis of locally adapted programs.

Proponents of the new program reject this concept insisting the current Standardization Program was

Continued on page 29



The Army Aviator's Sheet Music
(The New Operator's Manuals)

Any comments or recommended changes to the operator's manuals or the crewmember's checklists should be submitted to AVSCOM on DA Form 2028. All DA Form 2028s received by AVSCOM recommending changes to aircraft operating procedures are forwarded to the Aviation Center where the recommended change is researched and evaluated before they are included in the manual

William H. Smith

IN A GREAT ORCHESTRA the musicians are given sheets of music to guide them through the intricacies prescribed by the composer. Without this music it would be impossible for more than two or three musicians to play together.

Similarly, aviators are given operator's manuals and checklists for a specific aircraft to guide them in the operation of that aircraft. This is the aviator's "sheet of music."

Operator's manuals and checklists are the official documents governing the operation of the aircraft and the basis for standardization throughout the Army.

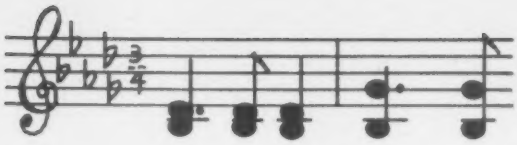
A major effort was made recently by the U. S. Army Aviation Systems Command (AVSCOM) in coordination with the U. S. Army Aviation Center, U. S. Army Maintenance Management Center, U. S. Army Electronics Command and other interested activities to revise the format of the operator's manual (-10) and checklist (-CL). The new format is designed to provide the user (Army aviators) with publications that are more appealing and easier to use.

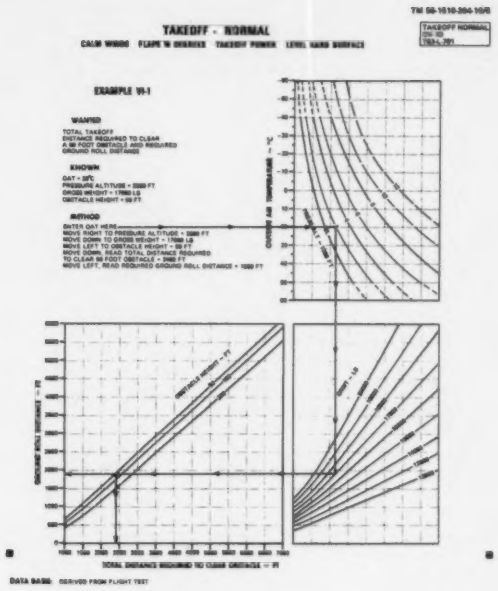
It is anticipated that the operator's manual will be organized in the following format:

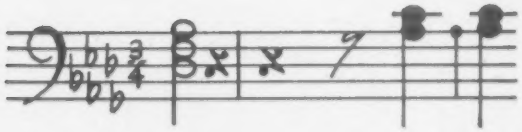
Chapter 1	Introduction
Chapter 2	Aircraft and Systems Description and Operation
Chapter 3	Avionics
Chapter 4	Mission Equipment
Chapter 5	Operating Limits and Restrictions
Chapter 6	Weight/Balance and Loading
Chapter 7	Performance Data
Chapter 8	Normal Procedures
Chapter 9	Emergency Procedures
Appendix A	References
Glossary	Abbreviations and Terms
Index	Alphabetical Listing

At first glance this may not seem to be a significant change but on further investigation we should find these improvements:

• Information pertaining to any given system will be consolidated in one location rather than being scattered throughout the manual.







• The chapter on mission equipment will describe any system that is related to accomplishing the mission of that aircraft, such as mission avionics for the U-21 and OV-1; armament for the AH-1, UH-1 and OH-58; and cargo handling for the CH-47 and CH-54.

• All performance data charts will be in one basic graphic format. This means that the aviator has to learn only one method of deriving performance information from the charts. In addition to the new format, a significant amount of additional information is presented.

• Procedural steps that must be memorized by the aviator in order to respond immediately to an emergency will be underlined in the checklist for easy identification.

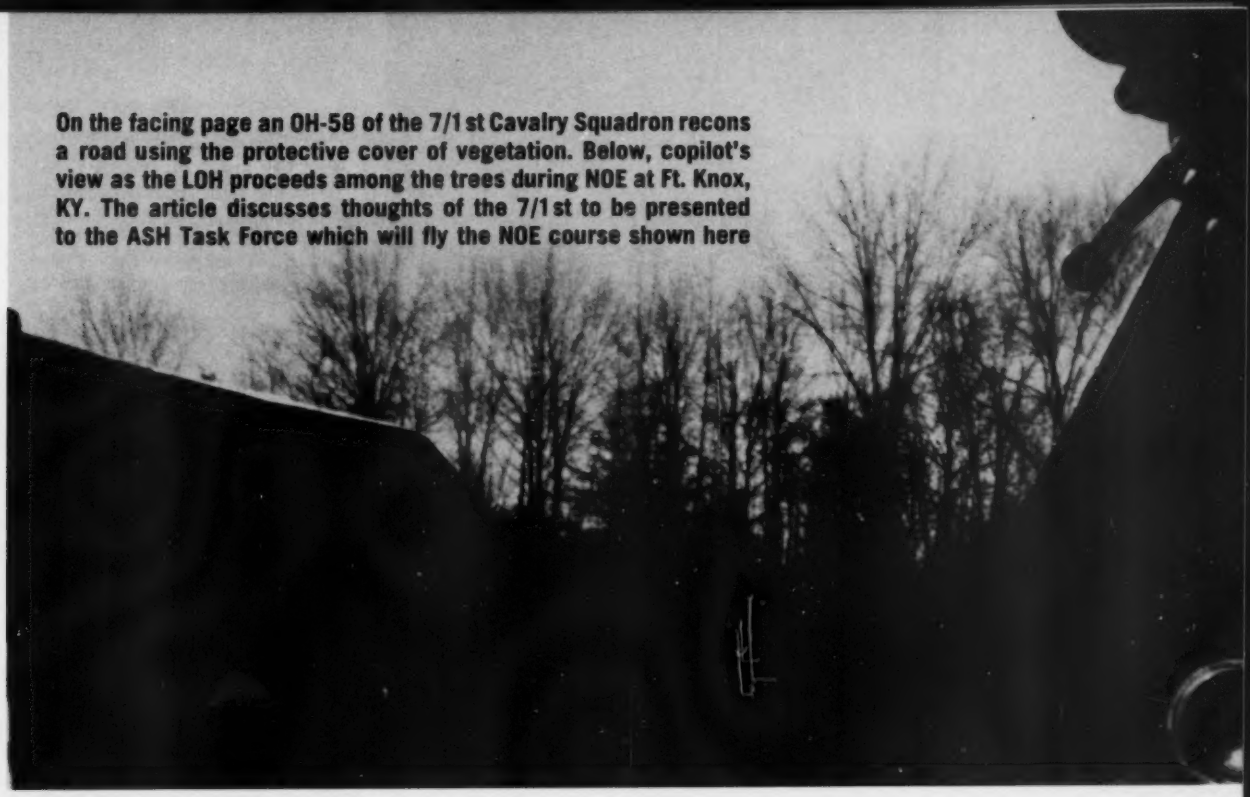
• Standard terms and abbreviations will be used throughout and will be defined in the glossary of terms in the back of the manual.

• Colors will be used where possible in order to depict more clearly aircraft performance and limitations.

A letter of agreement between AVSCOM and the Aviation Center at Ft. Rucker, AL, delegates to the Aviation Center the responsibility for securing a consolidated coordination of any material affecting chapters 3, 4, 6, 10 and 11 of the present aircraft operator's manuals (-10) and the complete checklist (-CL). It is anticipated that the Aviation Center will continue to have this responsibility in the new format. In addition, the Aviation Center is responsible for providing necessary assistance in the formulation of policies as they apply to the operator's manuals and checklist specifications.

The new military specification for operator's manuals has been sent to the Department of the Army through the U. S. Army Materiel Command for approval. If approved, the first operator's manual to appear in the new format should be available in about 9 months to 1 year.

The new operator's manuals will greatly improve the Army aviator's "sheet music" and hopefully get us all in tune. All aviators are encouraged to submit any recommended changes to the operator's manual or the crewmember's checklist to AVSCOM on DA Form 2028.



On the facing page an OH-58 of the 7/1st Cavalry Squadron recons a road using the protective cover of vegetation. Below, copilot's view as the LOH proceeds among the trees during NOE at Ft. Knox, KY. The article discusses thoughts of the 7/1st to be presented to the ASH Task Force which will fly the NOE course shown here

NOE Is For LOHing

CW3 Michael S. Lopez

John Marusich

THE 7/1st AIR CAV SQUADRON at Ft. Knox, KY, is using its light observation helicopters (LOHs) to orient members of the Advanced Scout Helicopter Task Force to the mission of the scout helicopter.

The task force made up of Army aviators, aircraft designers and technical researchers has been formed by the Department of the Army to prepare the specifications and designs for the advanced scout helicopter (ASH) which will enter the Army aircraft inventory as a replacement for the present LOH.

The 7/1st Air Cavalry Squadron has developed a nap-of-the-earth (NOE) scenario to show the ASH designers the mission of the scout helicopter. The cavalrymen believe the scout aircraft will be their primary mission aircraft in the nap of the earth . . . they envision it as a vehicle to extend the capabilities of the Cavalry commander. The cav's scouts look and observe through the trees and brush. Like the Indian scouts of old, the aerial scouts look for sign of movement and usage. The scout helicopter has to be designed to perform the scout mission to find, fix, track and report enemy movement.

Lieutenant Colonel Arthur Finch, commanding officer, 7/1st Air Cav Squadron, pointed out that most people think mud puddles are muddy. *Scout's no different!* They're only muddy if they've been used. This and other scout techniques are brought out during the orientation flight in which task force members receive demonstrations in low level flight, contour flying and nap-of-the-earth. The veteran scout pilots of the 7/1st feel that the scout mission will be basically the same as they flew in the Republic of Vietnam . . . With the use of NOE techniques for helicopter survivability against a mid- to high-intensity threat.

As the flight scenario continues, the ASH Task Force gets the feel for the mission as the Air Cav scout performs a route reconnaissance through the northern portion of the Ft. Knox military reservation. The veteran scout aviators point out the difference in man-made trails and those used by animals. They use masking techniques to provide the helicopter with protection from enemy radar and observation. They don't fly down the road they are reconning but rather observe from the flanks . . .

CPT Tom Green, CO of Delta Troop, 7/1st, briefs COL James G. Humphrys, Director of the Aviation Center's Department of Graduate Flight Training, about NOE at Ft. Knox. Below, cockpit view of minimal NOE altitude

during the scenario they dismount their task force member/observer to perform a ground reconnaissance around a blind curve near the crest of a hill, and the task force member learns of the ease of exiting and entering an aircraft over a collective pitch and cyclic. When they need to observe down a road, the Cav scout doesn't expose his aircraft but maintains a terrain mask while observing *through* the brush and trees.

After making the ground recon, the scenario mission continues and the scout recons the road from different avenues of approach until the road ends and changes into a trail.

Near the end of the mission the scout simulates receiving fire and the task force members see the need for a rapid acceleration to depart the hostile area. In addition to the orientation the troops of the 7/1st are working on scenarios where the scouts find and identify targets and vector AH-1 Huey-Cobra gunships of the troop into firing positions . . . as well as move members of the troops with the liftships.

While DIGEST staffers were with the 7/1st, a contingent of instructors from the U. S. Army Aviation Center at Ft. Rucker, AL, were being oriented to the ASH orientation program. The Aviation Center currently has a program underway with all Army aviation users to improve the flight training program.

INSTRUMENT CORNER

The Annual Writ

AR 95-1 states: "Each Army aviator on flying status will successfully complete the Army Aviation Annual Written Examination each fiscal year in accordance with AR 95-63."

It is that time of year again, the one time when all Army aviators have a common goal—the successful completion of the Army Aviation Annual Written Examination. To many Army aviators the annual writ is just another annual requirement—a prerequisite that along with a trip to the flight surgeon and an instrument checkride ensures the extra monthly income. This is neither the intent nor the purpose of the examination, so perhaps the name should be changed to annual review.

Once the Army aviator receives his wings and departs the United States Army Aviation Center at Ft. Rucker, AL, his formal aviation schooling becomes a thing of the past. Sure, there are subsequent transition courses, but the basic fundamentals are gained during initial flight training. The annual writ is intended as a review of these fundamentals and as a means to acquaint the aviator with current regulations and procedures.

The Army Aviation Annual Written Examination for 1974 has been designed to inform the modern day professional Army aviator of the latest changes to ARs, TCs, FMs, TMs and DOD FLIP publications and thus enhance his professional capabilities. The 1974 examination incorporates many of the changes found in the new AR 95-1, dated October 1973, and effective 1 December 1973. The exam for the first time incorporates questions and procedures related to TC1-15 Nap-of-the-earth Training dated June 1973 and AR 95-5, dated June 1966, and as in previous years information found in AR 95-63, dated 13 July 1973; TM 1-300, dated June 1963 with changes 1, 2, 3 and 4; and TM 1-225, dated 9 December 1968 with change 1.

The questions are derived primarily from publications the aviator would have access to while flying or planning a normal flight. The examination is presented, in part, as an actual flight with the examinee being provided certain information and situations and then conducting a theoretical instrument flight from point A to point B. The remainder of the examination is presented in a manner similar to an oral examination with general questions taken from the previously mentioned references.

The 1974 writ is comprised of several publications. The Reference Data Booklet (RDB) (pink this year in honor of women being accepted into the Army Aviation Program) is a consolidation of pertinent extracts from FLIP, Section I and Section II, IFR Supplement; VFR Supplement and Low Altitude Instrument Approach Procedures (VOL-8). Material presented in the RDB to include the approach charts is extracted from the 19 July 1973 issue of FLIP. The Washington Sectional Aeronautical Chart and the FLIP en route low altitude (charts L-27 and L-28) are also used as reference material.
Sectional Aeronautical Chart and the FLIP en route low altitude (charts L-27 and L-28) are also used as reference material.

The study guide for this year's examination is again presented in "pocket book" size, incorporating a one-time-through feature. This programed text should be completed prior to taking the actual examination.

An item analysis of the 1974 examination reveals that approximately 50 percent of the examination is devoted to instrument flight planning rules and regulations and 50 percent to visual flight rules nap-of-the-earth flight, Army and FAA regulations, and weather questions.

Worldwide Flight Standardization Program

Prepared by the Standardization Division
Deputy for Developments
U. S. Army Aviation Center

YES, THE "WORLDWIDE" flight standardization program is alive and kicking. AR 95-63 designates the U. S. Army Training and Doctrine Command as the responsible command for individual aviator training and related training literature. This responsibility has been further delegated to the U. S. Army Aviation Center, Ft. Rucker, AL.

The goal of the Army Aviation Standardization Program is to enhance combat effectiveness, aviation safety and professionalism through standard procedures and techniques to be used in operating Army aircraft. The Army flight standardization is to be accomplished by implementing standardized policy and procedures through standardization boards by——

- designating standardization instructor pilots (SIPs) at all levels to ensure compliance with the established procedures.
- conducting periodic standardization flight examinations of all aviators.
- operating Army aircraft in accordance with standardized procedures and technical literature.

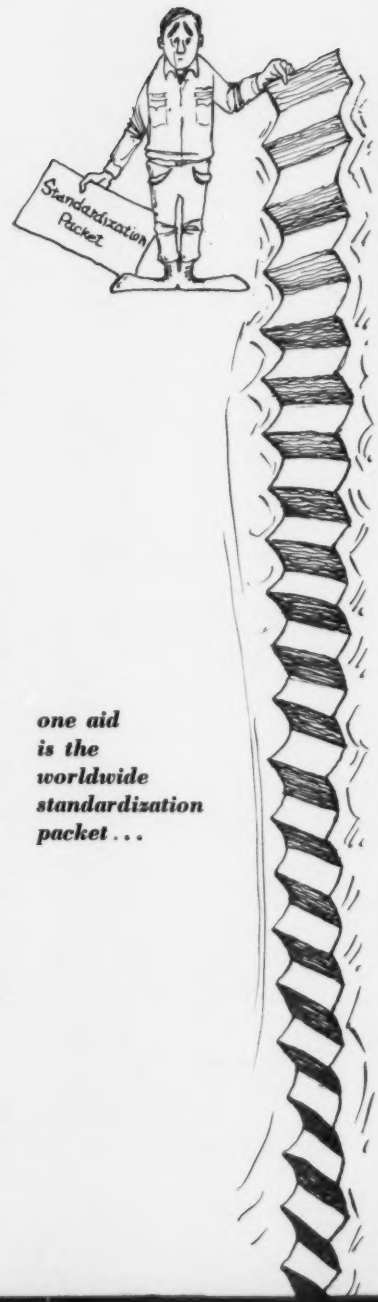
So far, so good. But how is the program actually working?

Standardization boards have been established and are becoming very active, especially at the higher levels of command. Within the past few months U. S. Army Forces Command (FORSCOM) has conducted a Flight Standardization and Training Conference to include personnel from all FORSCOM posts and units. In addition, the First, Fifth and Sixth Armies also have recently conducted Army-wide standardization conferences. These conferences were attended by personnel from the U. S. Army Reserves, National Guard and the active Army under the "Total Army Concept." The Aviation Center participated in these conferences to assist in presenting the latest in doctrine, tactics and techniques.

One aid used in the worldwide standardization program is the worldwide standardization packets which were prepared at Ft. Rucker to provide assistance to commanders in the administration of training for Army aviators. It provides assistance in transition training both for pilots and instructor pilots and also affords the aviator a handy reference booklet describing how to perform the normal maneuvers encountered from day-to-day.

Instructional material in the packets relates to the current model or models of one type aircraft and are sufficiently detailed to be utilized for refresher training, qualification training where authorized and guidance in planning operational missions for the aircraft.

A general description of the purpose and use of the publications included in the packets is contained in the accompanying articles.



one aid is the worldwide standardization packet . . .

Standardization At Fort Rucker

Prepared by the Standards Branch
Office of Standardization
Deputy for Training
U. S. Army Aviation Center

IN JUNE 1972 a letter was dispatched by the Department of the Army dealing with the Army Aviation Standardization Program. This letter was not the first on this subject and probably won't be the last because the standardization program is a vital part of the Army's safety effort. The special significance of this letter is that it announced a *worldwide* Army Aviation Standardization Program.

Implementation of this program within the U. S. Army Aviation Center (USAAVNC) meant the start of the most comprehensive review ever taken of training policies.

The intent of this standardization program can be separated into five distinct goals. The first—having a worldwide program—was automatically realized when the Department of the Army dispatched the letter. The second is being met at Ft. Rucker through the Ft. Rucker Flight Standardization Board, which provides standardization for all organizations at the installation. The board held its first meeting in October 1972. Prior to that time each organization at the post handled its own standardization with little or no coordination between units.

To date, 141 flight standardization boards have been established around the world. They are in the active Army, National Guard and Army Reserves.

The foundation of the entire program is based on maintaining the quality and standardization of instructor pilots (IPs), standardization instructor pilots (SIPs) and other Army aviators.

The third goal requires all IPs throughout the Army to be graduates of a formal IP course in the category of aircraft in which they will be instructing.

It was obvious that IPs trained at Ft. Rucker could not be produced instantly and dropped into the required slots throughout the world. With this in mind an interim means was provided by which IPs could be granted equivalent status to those trained at Ft. Rucker. This interim means has by now given way to the goal of having all IPs be graduates of formal courses and identified by additional skill identifiers and special qualification identifiers. Currently, Ft. Rucker offers 15 instructor pilot courses and one rotary wing instrument flight examiner course. All are being system engineered in an effort to improve content and to ensure that they support the needs of operational units.

The fourth goal requires all aviators to receive flight examinations on a periodic basis. AR 95-63, paragraph 1-18, requires that an aviator maintain proficiency in all the maneuvers necessary for initial qualification in the mission type, design and series aircraft as prescribed in TC 1-34. He must also demonstrate this proficiency to an IP or SIP at least once during a 12-month period. The IPs and SIPs are required to demonstrate their proficiency each 6 months.

TC 1-34, Qualification Training in Army Aircraft, indicates the particular maneuvers required for each type aircraft and the Flight Training Guide has detailed descriptions and the requirements for each specific maneuver. If a maneuver is required for initial qualification, it also is required on annual or semiannual standardization evaluations.

TC 1-34 has been changed to provide more guidance on pilot transition training and instructor qualification in various aircraft series. The change also requires aviation units with special equipment installed in helicopters to conduct training in the operation of that equipment prior to qualifying an aviator in the aircraft.

Instructor pilots are checked on the same basis as any other aviator. In addition, they are evaluated at least once during each 6-month period that they are authorized to conduct IP duties, when advancing to SIP status and after reporting to a unit prior to assuming IP duties.

These additional checks provide a means for the commander to evaluate instructor performance in methods of instruction, flight techniques and safety. Such evaluations are the basis for quality control of instructor pilots.

The standardization instructor pilot is the backbone of the entire flight standardization program. He must be relied upon to ensure the quality and standardization of other instructor pilots. For these reasons flight examinations of his performance are of the utmost importance. The frequency of evaluations and purposes for which examinations are conducted are the same as any other instructor pilot. SIP performance is a positive indicator of how aviators in the command are functioning.

The fifth goal—that of all commands using a single source of training literature—is being

according to the Flight Training Guide we should be autorotating . . .

reached through development and distribution of USAAVNC standardization packets. Guidance for implementation of this program stipulated that training materials that make up the standardization packets must fulfill training literature needs for aviator qualification and instructor pilot qualification for each aircraft.

The flight standardization packets consist of:

• Approved programs of instruction that specify course length, flight maneuvers and the scope of academic subjects to be covered in formal courses of instruction.

• Flight training guides that organize the entire course of instruction into training periods and give specific guidance on how maneuvers are to be conducted in a training environment. The guides contain detailed descriptions of maneuvers and the tolerances and limitations of each. These are intended to prepare an aviator to perform operational missions in the aircraft. These guides are neither designed nor intended to replace Department of the Army operator's manuals (-10) or operator's and crewmember's checklists (-CL) for specific aircraft.

• Lesson plans provide the academic background material necessary to support flight training. The training aids index in each lesson plan lists 35 mm slides, mockups, training films and other aids that are used in that course of instruction. Your unit may procure these aids by submitting a request through your supporting Regional Training Aids Center.

• Programed texts have been provided for some aircraft to be used with or in lieu of lesson plans. These are self-teaching devices. As new and better programed texts are developed, they will be added to the packets to supplement existing lesson materials.

• A sample examination is contained in the packet. It is to be used as a guide in preparing testing material locally to support the program of instruction. The packet examination is not related to any one aircraft. It is purely a guide for proper examination preparation.

• A standardized aircraft maneuver guide which provides the *aviator* with mission planning guidance, descriptions of maneuvers, how emergency procedures may be simulated and the pilot/crew evaluation checklist. The maneuvers described in this publication do not restrict the aircraft to the specific airspeeds, rate of climb, etc., used in a training environment but allow the pilot to select the performance necessary to accomplish an operational mission. The standardized maneuver guide stresses the use of the aircraft operator's manual and checklist for determining the performance capabilities of the aircraft and amplifies the description of maneuvers contained in those publications. It is not designed to replace the -10 or -CL. The pilot/crew evaluation section lists those areas in which an aviator may be evaluated during periodic standardization evaluations. The aviator is required to understand all normal and emergency procedures and to be able to demonstrate those procedures during the evaluation.

These packets are available on request through local standardization boards which in turn receive their supply from the Department of Army-Wide Training Support, USAAVNC, Ft. Rucker, AL 36360. Flight standardization boards are authorized to reproduce any material included in the packets to meet local requirements. The ultimate goal will be the inclusion of standardization literature in the Department of the Army's Adjutant General Publications System.

If discrepancies exist between the operator's manual and any publications in the packet, the op-

erator's manual will be used as the standard. Any recommended changes to the standardization packet should be addressed to: Commanding General, U. S. Army Aviation Center, ATTN: ATST-T-OS, Ft. Rucker, AL 36360.

The standardization program is designed to give Army aviation a standard by which all aircraft operations will be conducted. It is controlled by a local standardization board and relies heavily on school qualified instructor pilots to keep the program moving. The use of single source (USAAVNC) literature supporting the operator's manual (-10) is important and conducive to flight standardization.

The Office of Standardization (OS) is responsible for the standardization program at Ft. Rucker. It directs the activities of the Quality Control and Standards Branch. Standardization of worldwide publications is the function of the Standardization Division, Deputy for Developments (DD).

Computerized data is kept on all IPs at the Aviation Center. The IP may check on his own performance through the performance graphs maintained for all students. Each time 10 of his students complete their training, the graphs are shown to the IP who can then evaluate his flight instruction.

The student graphs also illustrate cumulative student data and the IP's performance as a check pilot if he performs evaluation duties. Careful analysis of this data may reveal weak areas to the instructor for future self-improvement.

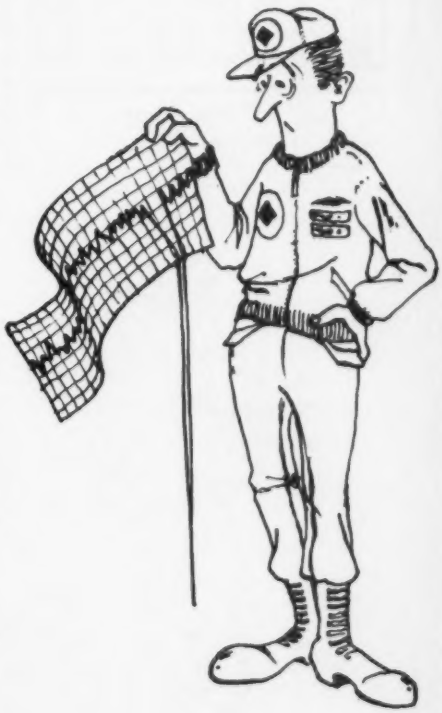
The Quality Control Branch reviews individual files when IP or SIP orders are requested on the students to ensure that all prerequisite qualifications have been met before orders are published. All pertinent recommendations and other data are evaluated to help improve the program.

The Standards Branch consists of highly skilled, senior warrant officers and Department of the Army civilians with at least one individual qualified as an SIP in each Army aircraft in the inventory. This branch conducts—

- All initial SIP and IP check flights, which include IP equivalency evaluations for units other than those at the Aviation Center.
- All Aviation Center SIP semiannual evaluations.
- Ten percent of IP semiannual evaluations for the Aviation Center.
- Evaluation flights in conjunction with medical authorities to determine physical capability of previously medically grounded pilots.
- Postaccident and postincident evaluations for the Aviation Center.
- Semiannual evaluation of the Synthetic Flight Training System and Link instructors.
- Flight test and evaluation of proposed or established flight training maneuvers to ensure analysis is thorough and adequate to the training environment.
- Academic and flight line standardization.
- Review of pertinent publications.
- Assistance visits to units located at other installations in conjunction with the U. S. Army Agency for Aviation Safety (USAAAVS, U. S. Army Training and Doctrine Command (TRADOC) and U. S. Army Forces Command (FORSCOM).
- Assistance visits at the request of units.

The Standards Branch is involved in question-to-answer research and analysis. Information derived from the analyses is published in regulations or circulars. The Office of Standardization has the responsibility for U. S. Army Aviation Center (USAAVNC) Regulation 95-15, and other pub-

I guess this means nobody's perfect . . .



who is Clara Bow anyhow?

lications pertaining to standardization.

Problems that cannot be resolved are brought before the Ft. Rucker Flight Standardization Board. The OS chief is president of the board; the chief of the Standards Branch is secretary of the board. The OS also represents USAAVNC at higher level standardization boards.

There are seven areas of interest when OS makes assistance visits:

- Flight standardization boards.
- Publications.
- Standardization instructor pilots, instructor pilots and individual aviators.
- Sequence of standardization flight evaluation.
- Use of aircraft checklists.
- Knowledge of aviation related subjects such as the operator's manual and the Flight Training Guide.

When a request for an assistance visit is received and approved, an itinerary is set up between the team chief and the various commanders. This itinerary lists the units to be visited, aircraft types and aircraft scheduling. This gets the groundwork coordination accomplished before the team departs.

Due to the time factor involved the itinerary is important and is followed as closely as possible. If a post has an installation flight standardization section, this unit will be the first to be visited.

When checking with the flight standardization boards some of the questions asked are:

- Does the board have an adequate number of members?
- Does the combined board membership represent all aircraft assigned?
- Is a senior instrument examiner a member of the board?
- Does the board visit all subordinate units?
- Does the board meet on a regular basis?
- Are minutes of formal meetings published and disseminated?
- Is the board capable of conducting business when not in formal session?

An area that frequently will yield useful information about a unit is the status of its publications. The biggest problem with publications is the currency of publications. Questions asked about publications are designed to see if they are up to date with the most recent changes and if pertinent regulations and publications are available to each aviator for easy reference. If pinpoint distribution is used, an attempt is made to find out how effective it is. This question is usually answered when the basic publications and changes are checked.

IPs are asked if they are "school" trained and if they possess a current instrument rating in the category of aircraft in which their IP duties are performed. IP flight records are researched to see that orders are published authorizing the individual to perform duties in the design, type, mission and series aircraft with which they are working. They are monitored to see that they have satisfactorily completed a flight and written examination by an SIP designated by the local standardization board. And last, a query is made to be sure that there are a sufficient number of IPs available for the required qualification training, examination and proficiency checks.

SIPs are asked about their own selection and utilization. Members of the OS team check to see that they have been placed on orders after successfully completing a flight and written examination by another SIP designated by the local standardization board.

Individual aviators are surveyed to see if they are administered periodic flight examinations and if they are meeting currency requirements of regulations. Their records also are pulled to see if aviator

qualification training is in accordance with TC 1-34.

To cover all major subject areas in standardization flight evaluations, the evaluation is conducted in four phases and in accordance with AR 95-63, AR 95-1, TC 1-34 and the Flight Training Guide. The concern here is with IP and SIP flight evaluations.

Phase one includes a comprehensive briefing by the SIP or IP. The examinee is briefed on what is expected during the checkride and what he can expect from the SIP or IP. Items covered during the briefing include procedures for transfer of controls, actions for actual emergencies and procedures for simulated emergencies.

Phase two is a discussion of major subject areas taught to instructor pilots at the Aviation Center and contained in the various aviation publications such as the operator's manual, Instructor Pilot Handbook and Flight Training Guide. The areas discussed are fundamentals of teaching and learning, effective teaching methods, aeromedical factors concerning flight instruction and aerodynamics useful for flight instruction. Other subjects reviewed are regulations and publications, operating limitations, emergency procedures and maneuvers that cannot be performed due to existing conditions.

Phase three includes a check of the preflight and runup procedures, inflight procedures and, after landing, engine shutdown and postflight. An inquiry is made to see that the checklist is in a proper binder, that a current and up-to-date checklist is in each aircraft and that it is being used. As a portion of the inflight procedures an evaluation is made of the normal, advanced and simulated emergency type maneuvers. A check is also made to see that the -12 and -13 are filled out correctly.

Phase four is the postflight critique in which the entire evaluation is discussed and any questions that might have come up are resolved.

The Flight Training Guide has four parts. The introduction basically explains what the Flight Training Guide is all about. The training sequence (flight syllabus) breaks the training down into flight phases or periods. The checkride requirements are the four phases covered earlier. The last part of the guide concerns the flight maneuvers. The training objective and maneuver requirements are examined and an analysis of the common errors associated with that maneuver are also discussed.

The Flight Training Guide is designed to be used for transition training; it has been years in the making and is continuously updated. The procedures contained in the guide provide for adequate safety. If better ways to execute these maneuvers are found, DA Form 2028s should be submitted to: Office of Standardization, ATTN: Standards Branch, U. S. Army Aviation Center, Ft. Rucker, AL 36360.

The team chief conducts an exit briefing based on observations and recommendations from the individual team members. Strong points also are noted and passed on to other units in Army aviation to assist and advance the standardization effort. Weak areas are noted and recommendations for improvement are offered. These observations and recommendations are probably the single most important part of the assistance visit.

During the 35 visits made this fiscal year it has been found that, in most units, the following problem areas exist:

- Publications—out of date or not available.
- Checklists—used improperly, lack of knowledge, out of date, missing from the aircraft or not in proper binders.
- Proper sequence for standardization flight evaluation not being used or administration of incomplete standardization evaluations.
- Lack of knowledge of aerodynamics and aviation related subjects.
- Lack of general knowledge of operator's manual.
- SIPs and IPs not using the Flight Training Guide for training but using the Standardized Aircraft Maneuver Guide instead.

Strict adherence to the Army Aviation Standardization Program will result in increased professionalism of Army aviation. The days of the scarf in the slipstream and the leather helmet have gone. Today's aviator must be professional and wholeheartedly support the standardization program if there is to be a continued reduction of accidents. Safety and standardization are synonymous.

concerning your stan ride, you do have a weak point or 2, or 3, or 4, or...

Effective Communication And NOE Target Recognition

Philip M. Drumheller, DAC
Training Developments Department
Deputy for Developments
U. S. Army Aviation Center

THE COMPLEX operations that are anticipated for Army aviation in future combat require a reliable electronic means of communication and accurate reporting of target information by the aviator or aerial observer. In an atmosphere of nap-of-the-earth (NOE) flight operations in a high air defense threat environment, effective communication will be extremely critical to coordinate, control and manage all maneuver and fire support assets. Responsiveness (the key to mission accomplishment), target acquisition and target engagement will all depend on effective communication.

During NOE flight, radio communications equipment line of sight limitations may virtually eliminate all but communication between aircraft. Furthermore, enemy jamming of radio communications, including line of sight, is a distinct possibility in future combat situations. In view of this, commanders should consider during unit training the prospect of reduction or elimination of radio communications and provide for prearranged signals between aircraft such as smoke markers or aircraft lights. Another difficulty in radio communication that should be anticipated is that as many as four channels of communication may have to be monitored simultaneously.

NOE flight operations require teamwork from start to finish. Navigation must be highly accurate to maintain geographic orientation and the copilot must constantly inform the pilot of the terrain that they expect to encounter. Throughout the flight the pilot depends upon crewmembers in his aircraft and in other aircraft in the same formation.

Reporting target information accurately in future NOE flight operations will be extremely critical. What might be reported as insignificant intelligence data actually may be the key to identifying an enemy location that is a definite threat to friendly forces.

Observations must be accurate if the data communicated is to be dependable. However, by summary of past experience there usually is a tendency to see what one expects to see. When in a familiar situation this tendency helps to fill in the "missing pieces" of a picture. For example, if an aviator closes his eyes after he is seated in the aircraft he may be able to visualize exactly where each instrument on the panel is located without difficulty. Concentration on information stored in his mind makes this possible.

On the other hand, the aviator may observe a column of unfamiliar enemy vehicles. He will not have a "set" of experiences to compare these images with and he may therefore be unable to correctly identify them (TM 1-380-3 provides a "mental set" of military objects to look for). Also, an aviator making a reconnaissance flight might briefly observe something that he did not expect to see. For example, the vehicles observed might be a part of a large bivouac area that includes parked enemy attack aircraft instead of just the column of unfamiliar vehicles which caught his attention.

An *observation statement* can only be made during or after an observation; for example, "At 1400 hours 20 troops crossed the river." Observation statements also must be limited to the facts observed. *Inference statements* are expanded, mentally processed evaluations limited only by the imagination of the communicator. Also, observation statements can be made only by the observer while inference statements can be made

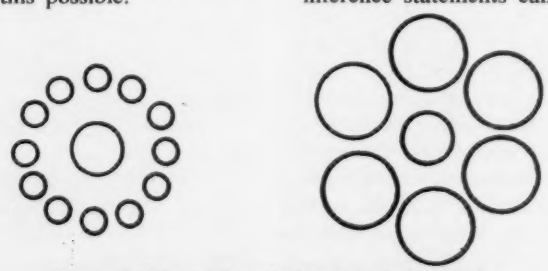
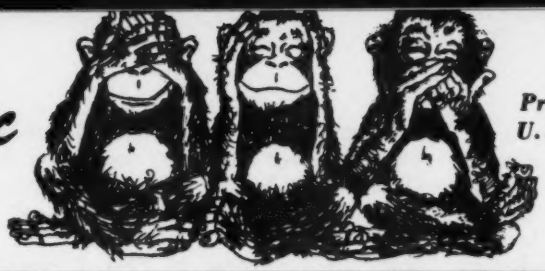


Figure 1: The center circles appear to be of different sizes but they are the same size

Aeromedic



Provided by the Society of U. S. Army Flight Surgeons

AN AVIATOR'S MOST critical and sensitive physiological capability is his vision. Not infrequently, those licensed to fly can steal and slither through controlled airspace aided solely by their sense of vision . . . its acuity, color sensitivity, depth appreciation, dark adaptability and untold other integrative functions. For man as an individual, the delights, the sheer thrill of flying are sufficient... words need not, often cannot, describe or capture the experience.

Men in combat cannot proceed alone in the pursuit of the enemy or objective ...the find, fix, fight and finish of warfare demands teamwork. Certainly, teamwork requires communication, usually communication in its highest form . . . voice or speech signals. Man's speech is a complex physical and physiological process influenced by both his psyche and the environment. His speech character and pattern is so specific it "fingerprints" his identity. Its character, if studied closely and systematically, can even reveal emotional and physiological state—a facet recently examined and reported by Russian scientists from the Moscow Academy of Science.

Too often what we say is taken for granted. Even more often we fail to carefully choose the words that might communicate our ideas or intentions most clearly. In the combat environment there is little time to know and emotionally understand all the people we so much depend upon for our survival. In addition, we seldom have the benefit of face-to-face communication and even more frequently this barrier is complicated by the environmental stresses of vibration and aircraft and communications noise. Even if emotional strain or jest could be communicated by transmission, it is often lost in the din.

Communication is an art and a science. Both aspects need to be studied and practiced in the aviation environment if performance will be maximized. The accompanying article may at first tickle your fancy. Let its approach lead you to serious thought and consideration about communications discipline. That's not radio silence, it's taking the care to communicate relevant and necessary information about the conduct of the mission.

The article concludes with a return to important visual aspects of flying; those of visual search and target recognition. This limited discussion will be covered more thoroughly in future treatments of the aeromedical aspects of nap-of-the-earth (NOE) flying. Visual search, target acquisition and communication will certainly be as important as flying the aircraft in the next conflict . . . they will be the keys to individual and unit survival.

NICHOLAS E. BARRECA, M.D.
LTC, MC, SFS
Commander, Army Aeromedical Activity
Ft. Rucker, AL

by anyone who has the original observation information.

Figure 1 illustrates how an inference statement may be made that *may not agree* with the facts. If we decrease the number of inference statements, the probability of miscommunication is reduced. Observation statements in essence approach reality (figure 2) while inference statements are merely guesses that may not be correct. It is essential to know the difference between observation statements and inference statements so that the degree of validity of the inference statements can be assessed.

Each of us has a background of a particular set of experiences and emotions. Misunderstandings develop frequently because there is a gap between the world that we see through our senses and the real world that we are talking about. To help overcome this communication gap in face-to-face communication situations, we must be sensitive to differences that exist in ourselves and others and also recognize the mental state of communicators.

Observing facial expressions during conversations discloses changes in facial expressions, breathing, vocabulary, gestures, posture and other clues to the speaker's mental state. You see the same person but something inside him changes. In a face-to-face communication situation each person may show a different personality at any moment and shift from one mental state to another.

As stated in a previous article ("Gestalt, Awareness, and the ASI," January 1972 DIGEST), Gestalt thinkers developed the

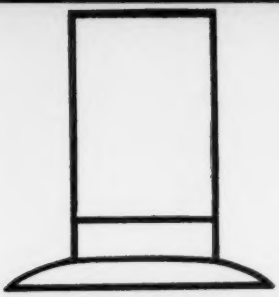


Figure 2: The height of the hat appears to be greater than the width of the brim but these dimensions are actually the same

notion that perception is entirely an internal phenomenon. Based on this idea, they formed a new area of psychology known as transactional analysis. Eric Berne pointed out in *Games People Play* that the premise of transactional analysis is the existence of relationships between mental states, as opposed to the existence of relationships between people. The basic terms used in making a transactional analysis to describe a state of mind are the terms *parent, adult* and *child* (PAC). These terms do not indicate chronological age but indicate personality states that can be easily recognized.

In his book *I'm OK—You're OK, A Practical Guide To Transactional Analysis* Thomas Harris describes transactional analysis. Using the basic terms of parent, adult and child to describe the mental states of each individual, a transaction takes place when there is a *stimulus* from one individual's parent, adult or child position and a response from another individual's parent, adult or child position.

Communication takes place when the stimulus and response make parallel lines (figure 3) and the response is appropriate. These transactions may be parent-parent, adult-adult, parent-child or the other possible combinations of parent, adult and child. An example of a parent-parent complementary transaction is:

Stimulus: "That observer is just no good."

Response: "Right! He never sees anything."

Communication is broken off when a *crossed* transaction occurs (figure 4). In figure 4 the stimulus is adult-adult: "Have you accomplished your task?" The appropriate adult response is: "No, I have not" or "Yes, I have." However, a flareup child-parent response such as "You know I don't have time enough to do it" is a crossed transaction. The only communication that is now possible is on the adult-adult subject of replacing this individual or a child-parent discussion that is meaningless.

Neurophysiological research has shown that the brain functions partly as a tape recorder that stores both past experiences and the accompanying emotional feelings of those experiences locked together. In the first 5 years of our lives most incoming information is recorded as received and used unquestioningly by our parent personality. This type of data has many do's and don'ts. Verbal clues to the parent personality are words such as "no way," "always," "impossible," "never" and "ridiculous." The parent personality may be judgmental and find fault. The child personality is also developed in each of our personalities during the first 5 years. It records feelings and events until 5 years of age. The child personality has great creativity and imagination; verbal clues are "I can't," "I want," "biggest," "greatest," and "best."

Adult personality development begins at the age of about 10 months when the infant is able to move around to encounter objects in the real world. This is the first opportunity for *logical* decisions. Figure 5 shows how the adult personality acts as a computer to evaluate and update the data received from all sources, make decisions and then store the updated data. Examples of adult verbal clues are "why," "what" and "when." By calm thought and self-control the adult processes data and computes the probabilities essential to survival in the real world. For example, a pilot flying a helicopter processes a complex amount of data that is necessary for safe flight. The adult personality also triggers or activates the functioning of the parent and child mental states.

Communication is a two-way

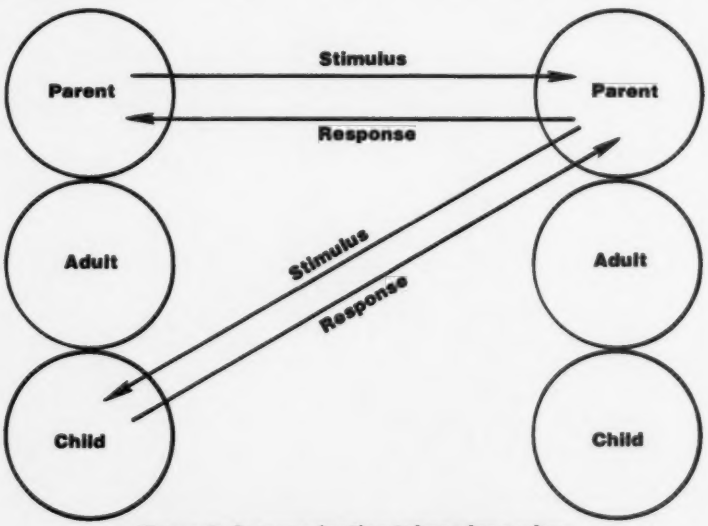


Figure 3: Communication takes place when stimulus and response make parallel lines

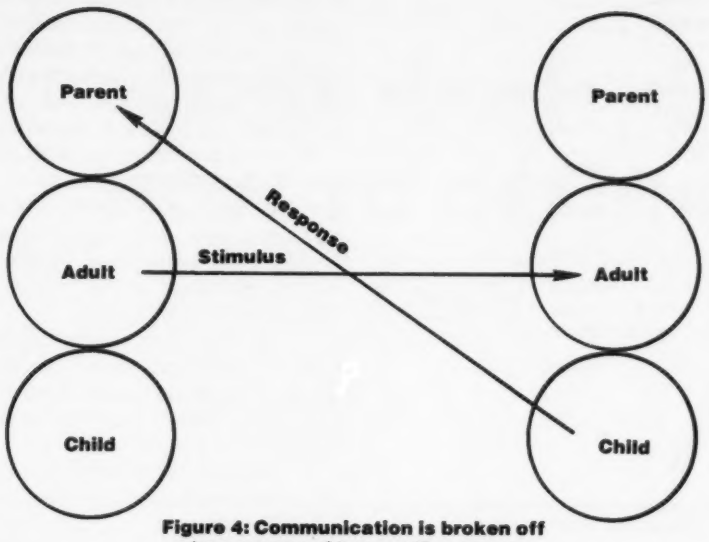


Figure 4: Communication is broken off when a crossed transaction occurs

street with responsibilities for both the sender and the receiver. The same words can be used in different ways and have different meanings, therefore, the situation and context of a message determine the meaning of that message. To evaluate information correctly the observer must be aware of the sources of his information. He must observe as many facts as possible and realize the possibilities of error when he originates or receives inference statements of false or out-of-date assumptions.

To avoid miscommunication, the sender should insist on a response from the receiver to ensure that the message is understood. If the receiver does not understand the message, senses something is wrong or thinks there is another interpretation of what is said, he should ask the sender for clarifying information. The receiver can be sure he understands the message by restating it in his own words and then asking the sender if he accepts this interpretation.

For effective communication during NOE flight the aerial observer must think about what he wants to say before speaking. Then all information should be given in a calm, clear, quick and concise manner. It is important for the observer to be emotionally calm and to mentally remain in his adult state (assuming an emotional or child position may become contagious and jeopardize the success of the mission). The aerial observer also should be aware of the PAC position that may be assumed by others and, if possible, he should maneuver them into their adult stance (figure 6).

The TM 1-380 series, "Aerial Observer Programed Texts," teaches how to observe, identify and plot target locations on a map in the very short amount of time required by NOE flight. FM 1-80, "Aerial Observer Techniques and Procedures," describes NOE visual search techniques. However, it should be noted that some of these references are based on visual capabilities for previously defined NOE altitudes of between 50 to 150 feet. This is not consistent with the current definition of NOE and thus probably alters the expected visual perspective. Nevertheless, certain estimates of expected visual performance, rough or general though they may be, are desirable. Remember though, these estimates pertain to conditions of good visibility and reasonable contrast. Points to remember on NOE target recognition include—

- At NOE altitude there is only a momentary observation of the target that does not allow sufficient time to evaluate it for a complete description. The range to the horizon is about 1,000 meters (3,300 feet). Normally, over vegetative terrain NOE altitude may allow a 500 meter (1,500 feet) maximum width of field of vision. The nearer the target, the shorter the time a moving and closing observer has to recognize it.
- The best field of vision for the human eye is the cone or "beam" of foveal vision (preferred search segment of 5 degrees, TM 1-380-2). Therefore, look at the target with the center of your visual field, moving head and eyes together to retain acquisition.

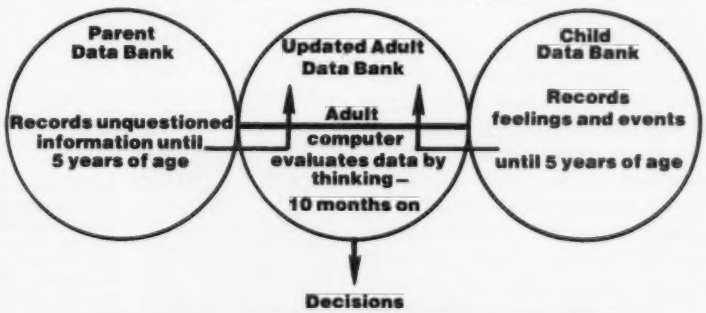


Figure 5: The adult personality functions as a computer to evaluate and update the data received

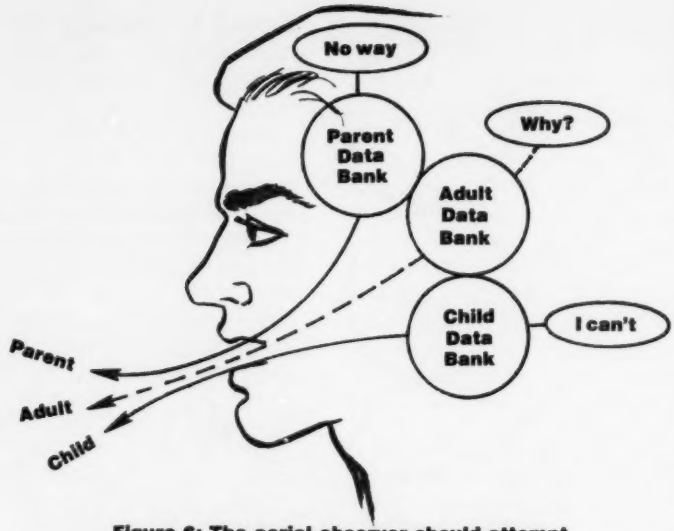


Figure 6: The aerial observer should attempt to hold communication at the adult level

• Observations should be made from the aircraft with the sun behind the observer's position to prevent dazzling the eyes and to hinder enemy detection of the observation aircraft.

• An object may be difficult to detect due to the limitation of its color and/or illumination contrast with the background. The enemy may try to defend against color clues and contrast by employing camouflage.

• Large size targets such as tanks or a 155 self-propelled howitzer can be identified and recognized reliably in clutter up to a maximum range of about 900 meters (3,000 feet) with the unassisted eye. The maximum range that the eye can identify and recognize smaller targets such as troops is about 300 meters (1,000 feet). As the distance to the target increases, the ability of the human eye to recognize distinctive characteristics of the target decreases.

• If detailed visual identification cannot be made, familiarization with the outline, shape or form of objects will facilitate detection of potentially meaningful targets for identification. For example, a camouflaged tank will probably be most easily recognized by its form or outline.

• Detailed vision of parts of an object may disclose the object. For example, a partially hidden and camouflaged tank may reveal sufficient details to allow recognition.

• An object's shadow may be even more revealing to an observer than the object itself. For example, bridges, vehicles and tents all have distinctive shadows which are easily recognized from the air.

• The position of an object in relation to the surroundings often aids in detection, identification and recognition. For example, enemy attack aircraft may be camouflaged in a bivouac area.

Texture of the surface determines the amount of light reflected, absorbed or diffused. Rough surfaces such as grassy fields reflect little light and appear dark to the eye. Smooth surfaces such as airstrips reflect more light and appear lighter to the eye than similarly colored surroundings. Extremely smooth glass or metal surfaces may shine in direct sunlight and are easily detected by aerial observers.

Points to remember on NOE effective communication include:

• Loss of line of sight radio communication may require prearranged communication between aircraft by visual signals (smoke markers or aircraft lights).

• All potentially useful facts that are observed should be reported (the whole picture is worth more than merely the sum of its parts).

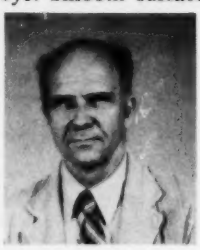
• Inference statements should be minimized and assessed for their probable accuracy.

• All communications should be made with a calm, analytical, *adult* attitude.

The aerial observer must be trained to recognize and be familiar with the enemy's assets to ensure that he will accurately identify targets. Observations of unidentifiable or unexpected targets should be anticipated so that a single unusual object viewed will not mentally obscure the remainder of the entire scene to the observer.

Communications must be limited to the facts observed without additional imagined modifications. The observer needs to use the self-control and logic of his *adult* mental state speaking calmly, clearly and communicate explicit facts.

Accurate target recognition and valid communication of facts—both are prerequisites for successful NOE combat operations.



Mr. Drumheller as a technical publications writer has been instrumental in the publication of several aviation oriented Army field manuals and special texts. While in the Army he was graduated from the Engineer Officer Candidate School and has a Bachelor of Science degree from Pennsylvania State University and a Master of Forestry degree from Duke University. The author has worked with electronics and aviation for more than 20 years

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Editor
U. S. ARMY AVIATION DIGEST
P.O. Drawer P
Fort Rucker, AL 36360

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Fuel Effectiveness ... to conserve the resources

Major Arthur R. Vaughn
Chief, Standardization Division
Deputy for Developments
U. S. Army Aviation Center

THE FUEL SHORTAGE is a major problem for the Army today and will likely be so for some time to come. An early casualty to the shortage could be the Army aviation readiness and training missions unless steps are taken to use every drop of fuel effectively.

A reduction in flying hours alone is not the answer. Such an approach would degrade both training and combat readiness. Instead, each commander with aviation assets must attempt to reduce fuel consumption while still allowing mission accomplishment and combat readiness training. The individual aviators must wholeheartedly support the program.

There are many procedures that may be initiated at each level that will result in fuel savings without reducing missions or degrading training. The most important procedure is to use and rely on the aircraft performance charts found in the operator's manuals (-10s) for all flights. In addition, there are numerous other actions that should be included in a fuel conservation program.

When planning a flight select the aircraft that will accomplish the mission most economically. Don't use a UH-1 Huey if an OH-58 or other light helicopter can accomplish the mission.

Reduce the gross weight of the aircraft to the minimum necessary for mission accomplishment by removing excess equipment, fuel, weapons and personnel.

The old adage about the fuel left behind being of no use to the pilot is correct; however, excess fuel does add considerably to the gross weight of the aircraft. Plan your mission to include fuel consumption, adding that which is necessary for reserve, and then only carry the amount of fuel needed to accomplish the mission.

Another matter deserving attention is that of empty seats. Do not fly extra passengers—additional crewmembers and friends—who just want to go along for the ride. They add weight which requires extra fuel consumption. However, don't fly with empty seats when with a small adjustment in your flight plan you can accommodate another passenger and in this manner avoid another flight in the same general area.

Flight scheduling should be of utmost importance to commanders and operations officers as well as to individual aviators. Procedures should be initiated to keep all who may have a need to fly aware of impending flights. This will enable interested personnel to arrange to take advantage of available seats and reduce the possibility of an unnecessary flight being scheduled with similar routing. This can be accomplished by joint flight scheduling conferences and widely publicizing scheduled flights.

Give your attention not only to the inside of the aircraft but also to the outside. Reduce external stores to the minimum; remove the armament subassembly, mounts and fairing when they are not required for the mission. Anything hanging on the outside of the aircraft not only adds weight but also creates drag. If it is not mission essential—get rid of it.

Through proper planning much can be done to save fuel before the aircraft become airborne. If the weather is cold, preheat the aircraft to reduce warm-up time, especially if the aircraft has a reciprocating engine. Conduct your navigation/communication radios and aircraft equipment checks by using an auxiliary power unit when one is available. Also, if possible obtain your IFR clearance prior to starting the aircraft. All aviators should review and become familiar with cockpit procedures to minimize run-up time.

A great amount of fuel can also be saved by using sound hover/taxi procedures. Aircraft should be parked so that unnecessary taxiing is eliminated. In an airplane, taxi with minimum power and do not ride the brakes. In helicopters with wheels, ground taxi instead of hover taxi. In skid type helicopters, each pilot should strive to reduce hover time to the minimum.

Once airborne there are numerous other procedures that may be used to conserve fuel. If the flight is for combat readiness flying (CRF) minimums or where the time airborne should be maximized, i.e., aerial observer training, use the maximum endurance airspeeds found in chapter 14 of the operator's manual. These airspeeds will increase the time airborne while consuming the minimum amount of fuel. En route use the maximum range airspeeds and the optimum altitudes found in chapter 14 of the operator's manual. The maximum endurance airspeeds should also be used in all holding patterns.

Where suitable make descents by reducing power rather than by retrimming at cruise power conditions. While climbing or descending keep the aircraft in a clean configuration, i.e., no flaps or speed brakes.

Limit the time of maximum performance operations to only that necessary for proficiency.

When flying the T-41 adhere closely to the guidance on the placard on the instrument panel regarding takeoff and climb fuel flow settings. With the T-42 obtain accurate power and fuel flow settings from the horsepower calculator as soon as reaching cruising altitude.

Aviators flying fixed wing aircraft should use minimum flap settings (15 degrees or less) consistent with safety for approaches and landings when the field length will permit this configuration. In addition, they may avoid use of propeller reversing where the runway length permits and try using approach flap setting for landings instead.

If an aviator finds it necessary to use speed brakes when flying the OV-1, it is an indication that he is wasting fuel. Plan airspeed reductions in advance in order to minimize the need for these brakes.

In addition to these suggestions for reducing fuel consumption there are a few others that may be considered.

Be like the bee, fly straight to your destination. Planning so that your flight will be direct is easy with VFR and practical when flying IFR. Request direct routing and en route vectors.

Fly high. At a given power setting true airspeed increases with altitude which means more miles per gallon of fuel. However, don't fly at an altitude where the speed gain is offset by unfavorable winds. In planning your flight, ask for winds aloft and take advantage of those altitudes where favorable winds exist.

The above suggestions when put into action will not decrease the flying hours of a unit but they will markedly reduce the amount of fuel necessary to maintain training and combat readiness and help to use every drop of fuel effectively.

Hello Fort

Numerous calls from a ask the question answe

CW4 Herbert M. W

CW4 Waterfield is flight commander, Examiner Flight, Department of Graduate Flight Training, Ft. Rucker, AL

"HELLO, Fort Rucker [AL]? I want to speak to someone in the Aviation School who is familiar with the examiner's course."

"I'm CW2 Righttonn; go ahead, I may be able to help you."

"Well, I'm on orders to attend the Rotary Wing Instrument Examiner Course and I'd like to know what to expect once I begin the course."

"What to expect? You must be joking!"

"What was that? Say again, Fort Rucker."

"Uh, never mind, now to get to your problem—I mean your question.

"After the usual in-processing at Fort Rucker, you'll be briefed by the commander of the Examiner Flight concerning your training during the 6-week course. In this briefing you'll hear such words as 'appearance,' 'attitude,' 'motivation,' 'safety,' etc., and you'll be informed of the structure of your training. It will be conducted in two stages. Stage I is the proficiency stage and consists of 29 hours of hooded or weather flight including an end-of-stage checkride. Stage II is the student examiner stage which includes the final checkride. It is 31 hours. The aircraft used for both stages is the UH-1H. At the conclusion of this briefing, you'll be released for the remainder of the day.

"Ground school classes will begin the next day. You'll attend class for half a day and spend the other half flying. This schedule is alternated weekly. One week you'll fly in the mornings, then the following week in the afternoons. I might add, however, that these are 'Texas-size' half-days.

"The ground school, I assure you, is outstanding. Instrument regulations and procedures are meat and drink to the platform instructors and they can quote page and paragraph in their replies to questions. In addition, they will usually expound on the *reasons why* these regs and procedures have been so established. They will also listen sympathetically to your problems about flight instructors 'acting up' or their adding that well-known 'color' to your grade folder.

"But even with all this talent available to you, I want to interject a note of caution. Although the ground school is very complete, you are expected to be knowledgeable enough to pass an extensive oral review and to fly an initial issue checkride on your first scheduled flying day. In other words, don't expect to be taught everything here —the course is too short for that. To quote one extremely qualified instructor, 'This is a self-help course.' You have to be interested enough in the course to help yourself and gain supplemental knowledge on your own time.

"The flying portion of the course varies little from day-to-day. The senior class which is in Stage II, or examiner stage, gives an instrument renewal or initial issue checkride each day to the Stage I students. Whether you pass your first check-

Rucker

all over the world
ered by the author

Waterfield

ride or not, your instructor will make his best determination or evaluation of your potentiality for training to reach the standards of this course within the time allotted. Some of the qualities he will consider in his evaluation are your aviation experience, instrument knowledge, aptitude, judgment, control touch, initiative, motivation and, of course, your attitude.

"After successfully passing your proficiency checkride at the end of Stage I, you will enter Stage II of your training and begin to administer the checkrides; but—yes—you are still being checked by the instructor pilot and you'll probably see PINK sometime during this stage. It is possible for the examinee to pass his flight and the student examiner (you) to fail. So you see, there is no letting up or 'cruising through' this course.

"I encourage you to work with an instrument examiner at your home base prior to departing for Fort Rucker. He will know best how to prepare you to derive the maximum benefit from the course. As a minimum, you should refresh yourself in basic instruments, en route work and approaches to include emergency panel preferably in a UH-1H. This is necessary if you find it a constant struggle to fly the aircraft while under the hood because you'll be unable to plan sufficiently ahead of your flight. Also, bone up on DOD FLIPs, ARs 95-1 and 95-63 and the FAR 91 series. If you must struggle with procedure or regulations, you'll not be able to properly divide your attention between that and flying the aircraft, don't you see?"

"Yeah, I see, I see why we have no examiners here. You guys wash them all out! I think I'll call branch and get off these orders."

"Hey, wait! Don't hang up. I didn't mean to discourage you. I merely wanted to put the course in its proper perspective. It is a demanding course. You'll get about 12 flights in each stage and that does not allow time to make repetitive mistakes. But we're here to serve the commanders in the field and the United States Army. We will not graduate at any cost but when you're sent here we assume you are needed in support of some unit's mission performance and we do our best to graduate you as a highly qualified instrument examiner who will help uphold the exacting standards of Army aviation.

"Well, I hope I've answered your question to your satisfaction. We're looking forward to seeing you soon. Hello! Hello! Hmmmm, wonder why he hung up?"

NOTE: Many phone calls are received by the Examiner Flight for interpretation of regulations. We request that you first contact your local flight standardization board. If further assistance is needed call the Office of Standardization, Fort Rucker, AUTOVON 558-3504. Personnel there will be glad to answer any questions you may have regarding the interpretation of regulations.

Hello! Hello! Wonder why he hung up?

VIEWS FROM READERS

Sir:

I am inclosing a copy of a letter [see paragraph starting "Members, AAAA below] submitted for open discussion at the recent AAAA meeting in Washington. Apparently time did not permit floor discussion so it was not brought before the members. Also attached [see paragraph starting "Current Situation" below] are my suggestions for possible revision of current regulations, which I have submitted under the Suggestion Program. This information was not submitted to AAAA.

Request you insert [both] into VFR. Perhaps with enough reader response and some changes (I'm sure there will be some) all of us can benefit instead of continue to live under this steady erosion of Army aviation.

MAJ James W. Mouw
U.S. Army Transportation School
Ft. Eustis, VA 23604

Members, AAAA:

1. With the realization that the new AR 95-1 is still wet from the presses and different basic missions require somewhat different flying programs between the services, inclosure 1 [see box below] is attached to attempt to clarify *vastly* different flying hour programs which have evolved as a result of recent restrictions on flight hours.

2. The basic questions that arise (and I am sure you will be able to think of more), are as follows:

a. Why can the USN log night hood (NH) to satisfy both night and instrument minimums concurrently, when the USA and USAF cannot? Think how much easier the scheduling of your minimums would be if these were concurrent—*especially* with the new 20 hour annual night requirement.

b. Why are those of us who have less than 1500 hours limited to 80 hours annual proficiency flying when both the USN and USAF are limited to 100 annual hours in a similar situation?

c. Our night minimums have been increased to 20 hours annually—apparently to absorb the 5 hours night tactical training now required. Now that

FLIGHT HOURS COMPARISON—USA/USAF/USN
Minimums (Maximums)

	Semiannual				Annual				
	Night	Inst	Tactical	Total	Night	Inst	Tactical	Total	Source
USA	7(13)	7(13)	7(13)	30(50)	20	20	20	80(80)	AR 95-1,20 Dec 72
USAF[5]	5[3]	8[3]	0	40	10[3]	20[3]	0	100	AFM 60-1,15 Jan 73
USN[1/4]	6[3]	6[3]	0	40	12[3]	12[3]	0	100(110)[2]	Chap X, OPNAV Inst 3710.7F, 27 May 71

NOTES:
[1] For USN pilots in Category 1, which is those who are not both 45 years of age or more and who have not held designations for 20 years or more.
[2] USN pilots cannot fly over 110 hours annually in proficiency aircraft (logged as "B" time) however, they can log over 110 if in aircraft not specifically programed for proficiency flying (such as with operational squadron).
[3] USN pilots can also log night and instrument simultaneously to satisfy requirements. USA/USAF cannot.
[4] A revision of 3710.7F, dated 13 Jul 72 states that Naval aviators will be required to continue to fly for proficiency until 15 years rated service at which time they may still fly if in an operational flying billet.
[5] USAF regulations require a pilot to continue to meet proficiency flight requirements until he reaches 15 years and 3000 flying hours.

our night minimums are about twice that of the other services, should we be asking ourselves if the training value is worth the additional hazardous exposure?

d. Since Army aviators are now "cut off" at 1500 hours, unless in a flying duty position, it logically follows that the USAF and USN must be in the same position since the same rules *should* apply to them. The USN is required to fly for proficiency for 15 years—hours are not stated. USAF regulations require that flight proficiency minimums be met until 15 years *and* 3000 flying hours. Why then are we in the Army living with criteria which limit us to 50 percent of the other services flying hours. As more and more of us phase out of aviation, what will happen to our skill base, our accident rate, and to Army aviation as an entity capable of rapid response to conflicts which threaten the United States?

3. This is not written with the intent of sharp-shooting those who have done their very best for Army aviation. It *is* written to attempt to get all of us moving toward correcting apparent inequities which contribute to the erosion of Army aviation.

4. We started "Above the Best"... let's stay there.

Current Situation: Reference Flight Hours Comparison—USA/USAF/USN.

Suggestion: 1. Permit the logging of night hood (NH) flight toward concurrent satisfaction of night (20 hours) and instrument (20 hours) annual flight minimums. Vastly easier scheduling of minimums would result for aviators.

2. Reduce the night time required to 15 hours, as previously required. The increase of hazardous night flying to a point roughly double that of the USAF and USN is of questionable value.

3. Inaugurate a program whereby aviation time flown on "S" (service) missions do *not* have to count toward the 80 hours maximum now allowable for aviators (but can at the aviator's option) in an "under 1500" hours category. This, as in the USN, allows completion of minimums and flying time with some latitude for those who may feel they need more flight time than strictly "T" (training) time allows. This is going to result in (a) safer pilots, (b) less cost in the form of lives and accidents, and (c) a generally higher level of proficiency and capability of Army aviation. This also allows for individual adjustment by the aviator if he is flying fixed or rotary wing for proficiency.

4. I realize that mission type will dictate a possible larger number of total flight hours for USN and USAF aviators, but to say that they can continue to fly on a proficiency basis (unless assigned to an operational flying slot) for up to *15* years and *3000* hours when the USA is limited to *1500* hours does not realistically approach the problem of aviator proficiency in the face of current fund reductions. I propose a dual system for the USA in which aviators would be required to maintain minimums for 15 years *or* 3000 hours, whichever arrives first. Note that this is a substantial reduction over USAF minimums (15 years *and* 3000 hours) and probably approaches the time a USN aviator would have at his *15* required years.

RESULTS: If an honest effort is made to upgrade our flying hour program to a par with the other services, the USA will benefit by possessing a safer, better trained aviation skill base capable of the rapid response necessary in conflict. To continue to exist (live is *not* the correct word) with a reduced program which cannot help but gradually erode Army aviation responsiveness and safety strikes a black mark on all who would answer "sorry, but due to funds limitations..." when asked to respond favorably to a more reasonable program in line with sister services.

• The following was received from the Director of Army Aviation:

This is in response to your open letter to members of AAAA which compares flying hour requirements of the Services. As stated in your letter, each military Service has designed annual flight requirements based upon considerations peculiar to that Service. For example, each Service's mission is unique and vastly different aircraft and tactics are employed to support that mission. You may have noticed that AR 95-1 provides suggested training programs for operational and proficiency aviators which are designed to maintain high standards essential for the performance of continuous day and night operations in a tactical environment. I am certain you would agree that the recommended Army aviation training is not compatible, for example, with C-141 pilot training in the USAF. Therefore, a comparison of annual flying hour requirements between the Services is not meaningful.

Now, I would like to address specific areas of concern mentioned in your letter. On the surface, your recommendation to permit logging of night hood appears appropriate since we recognize night weather towards both instrument and night minimums. However, it would not be appropriate for an aviator to fly all night minimums under the hood. Therefore, we will evaluate your suggestion in light of combat readiness requirements to determine if an equitable solution is feasible. Second, night minimums were increased to improve aviator efficiency in tactical night operations. As you know, the U.S. Army is devoting a great deal of effort toward developing greater proficiency in large unit night operations. Naturally, Army aviation must be prepared to support the Army's all-weather day and night capability. Our annual minimums are oriented toward that goal.

Lastly, there is nothing magic about 1500 hours and 80 hours. In compliance with Public Laws which set forth flying criteria for the Armed Services, Department of the Army has set what we feel to be the minimum flying limits necessary to maintain tactical readiness for all operational and proficiency aviators. It is recognized that some proficiency aviators desire to fly more than 80 hours per fiscal year; however, Department of Defense constraints prohibit proficiency aviators from flying more. For your information, we are introducing the Synthetic Flight Training System (SFTS-2B24) throughout the Army. It can be anticipated that much of your instrument time will be flown in these SFTSs as a cost effective and energy saving measure.

Your comments and interest in Army aviation are appreciated. Feedback from aviators like you helps us keep the aviation program moving. Best of luck in your present and future assignments.

James H. Merryman
Brigadier General, GS
Director of Army Aviation

Sir:

I am writing to try to obtain an article which appeared in the AVIATION DIGEST concerning CH-54 operations in an arctic environment. I believe it was published in 1971 or 1972. We have no file copies here which go that far back.

Would appreciate any assistance you could give in obtaining this particular

issue of the DIGEST, or possibly a copy of the article itself.

CW3 Richard T. Harrison
343d Aviation Detachment (HH)
APO Seattle 98731

• The article entitled "Arctic Test of the Crane" appeared in the November 1969 DIGEST. A copy has been mailed to you.

Sir:

Those of us who have been around long enough remember restrictions on flying due to shortage of funds, but shortage of fuel—now that's a new problem. Whose problem is it and what is being done?

To start with, all aviation units or activities have an annual flight hour program. Due to the fuel shortage units will have their programs reduced. This of course will save fuel, but now units find it necessary to intensify their managing of remaining hours to complete minimums and essential missions.

The job of managing the use of this limited resource is now very important. Each commander should ask what his unit is doing. How good is its fuel conservation program? Is it achieving maximum utilization of each gallon consumed? Have all fuel economy measures been implemented?

There are many official actions being taken to limit the use of fuel. I would like to recommend one method that might be overlooked. Everyone is familiar with fuel savings by reducing speed of an automobile. Well, this also applies to flying helicopters under certain conditions.

Does your unit have a policy that requires certain UH-1 flights be conducted at 54 knots indicated airspeed? Sound ridiculous? No, take a look at the maximum endurance chart in the operator's manual (TM 55-1500-202-10). Flying at power settings and speed indicated can save approximately 20 percent fuel consumed by normal cruise power. Of course, these power settings are most efficient for minimum fuel consumption per flying hour and does not relate to distance traveled, therefore, could not be applied to all type flights. Most local flights made to achieve minimums could be conducted under this method. This fuel saving method is most relevant to active Army flight activities supporting ground duty pilots and reserve component flight units where a high percentage of flying will be for maintaining proficiency and to achieve minimums.

Employment of this maximum endurance power setting can save fuel but will require selection of flights it will be conducive to and, of course, indoctrination of aviators as to its importance.

MAJ James W. Raible
Army Advisor
Army Aviation Flight Activity
Meridian, MS 39301

[Editor's note: See article beginning on page 22 of this issue.]

Sir:

Reference your article in the October AVIATION DIGEST on starting fires under survival conditions.

I carry the waterproof match container that has a flint sticking pad on the bottom. Inside I can get 50 cotton balls if you compress them well. To start a fire just fluff out a cotton ball and strike a spark into it.

This method eliminates the matches rattling around in the container which makes noise when you move as well as breaking off the tips.

CW2 James L. Broderick
USAR Flight Facility
Des Moines, IA 50321

Sir:

Paragraph 6-10, note, TM 55-1520-210-10, states that the engine anti-icing system is inoperative on helicopters with sand and dust separator system installed.

I am inquiring if this statement is correct?

CW2 Michael L. Allen
155th Avn Co (Atk Hel)
Ft. Ord, CA 93941

• The Standardization Division, Deputy for Developments, at the U. S. Army Aviation Center coordinated with AVSCOM and provided us with the following information:

The anti-icing system on UH-1 helicopters is not inoperative with the sand and dust separator system installed; rather it is ineffective. The engine ice detecting system is disconnected when the sand and dust separator is installed, thereby preventing detection of inlet ice. The engine anti-icing system is operational; however, due to ice accumulation on the screens, not on the engine inlet area, engine anti-icing is not possible. The Aviation Center will recommend that the operator's manual be changed to provide a better description of the anti-icing system.

Sir:

It seems to me that overspeeds due to high-side governor failures in UH-1s could be largely eliminated if a simple change were made in the normal operating procedures used by pilots.

If the throttle is reduced to a position just above the point where manual control is gained, a high-side failure is less likely to overspeed the engine and rotor. I can think of no reason why the throttle cannot be safely reduced to this point at any time the engine is to be operated at a constant N_1 speed for a reasonably long period of time, e.g., long climbs, long descents or in cruise flight. To preclude loss of engine/rotor rpm, the throttle would have to be in the full open position only during approaches, hovering and power increases.

Do most high-side governor failures occur at times when this procedure would reduce the likelihood of overspeeds? Do failures occur often enough to justify the adoption of this procedure?

CW2 Robert H. Tenney
Pennsylvania ARNG
345 Prospect Street, Apt #707
Morgantown, WV 26506

• The Standardization Division, Deputy for Developments at the U. S. Army Aviation Center coordinated with the Center and the U. S. Army Aviation Systems Command and provided us with the following information:

The procedure you recommended . . . has been evaluated and the following determinations made:

a. With the throttle set as described the engine fuel control does not respond to an increase in collective pitch thereby causing a decay in rpm and/or the requirement for pilot adjustment of the rpm.

b. Flying with the throttle in the suggested position could cause other emergencies to occur when an immediate power response is called for by the pilot, e.g., an evasive maneuver.

c. Under the present concept of nap-of-the-earth flight the throttle must be in the full open position to respond to maximum power requirements instantly.

d. Overspeeding N_2 governor emergencies are not predictable to the point of determining the value of this procedure. For example, an overspeeding N_2 governor emergency is as likely to occur as the throttle is moved to the full open position (after having previously been set as suggested) as at any other time.

Flight Standardization... Where Does It Begin?

Continued from page 3

methodically developed by aviation experts who incorporated into it standards of excellence designed to motivate the aviator's total commitment to flight standardization. In addition, the proponents point out there exists in the new program sufficient latitude for its application in local situations without adaptation by self-styled "experts" at the unit level.

Whatever your personal views may be, the Army has chosen between these two approaches to flight standardization. Since the choice will have a resounding influence on future developments in Army aviation, further comparison of the two philosophies is desirable to point out the built-in qualities of the Army's new approach as opposed to the former dictatorial or forced standardization found at local units.

Forced standardization of a locally adapted program offers the commander an easy out and promotes neither higher ideals nor needed professional attitudes for his aviators in the cockpit.

Those who affirm that forced standardization is sterile and cannot bear fruit for the aviation program are entirely right. Compulsory standardization is indeed a sad and most disastrous predicament for an Army aviator to endure. But those conscientious aviators who have been pursuing their aviation tasks under the influence of a dictated standardization program can now be offered a better option: a new and more effective approach.

What then is *authentic* flight standardization? It is essentially an aviator's voluntary dedication to the use of aircraft operating procedures and techniques which have been expertly fashioned and explicitly provided for the performance of his aviation mission tasks. It *is* a program which allows the standardized aviator to retain his free spirit. He is a military professional, one of many, who has chosen to conduct his duties in the most outstanding manner possible. He does not suppress or extinguish his own judgment and energies but accepts the *best* information and guidance that can be offered and elevates these and gives them a new power. He cultivates his judgment and energies of his own *volition* with the aid of optimum standardized procedures and techniques to a higher plane.

Such a standardized aviator is in every sense a consummate professional; it is almost beyond the capacity of today's performance measuring devices to calculate his potential value to the aviation program. Given a chance, this aviator's contributions to effective unit operations can be limitless. He will be more resourceful and better able to react to unforeseen flight requirements in peacetime and in combat.

Mere attempts at mechanically conforming to the best procedures will not guarantee positive contributions from an aviator. But if, in addition, he is highly motivated, able and can have faith in the judgment of the aviation experts who back him up, he will have a way of sensing—*and even experiencing*—the highest achievements of mission accomplishment.

It often seems to many that *any* form of flight standardization imposes the renunciation of one's own judgment in favor of procedures developed by others—that it disables the aviator and suffocates his instinctive desire to perpetuate his own judgment capabilities. While this is true under forced standardization, it is certainly false under the emerging concept. With true flight standardization the good, the inexperienced, the young, the deficient and all aviators in need become preferred objects of its responsibility to whom the best aircraft operating procedures that can be developed are provided.

Even under the emerging standardization concepts there must be those experts who establish standards from within the aviation program. Forced standardization has spawned the somewhat apprehensive feeling that these people evade the obligations and the preoccupations of aviators operating within field units and cannot possibly know what is really needed. This charge—not without some credence—is indeed serious in that those who set standards for others take upon themselves grave responsibilities: first, responsibilities of determining what standards are needed by all; and secondly, that of bringing together the aviation expertise needed to develop and maintain the standards. They cannot isolate themselves and accomplish this task.

An aviator cannot be effectively standardized without motivation, training and, most important, sound procedures provided for his use. Without the proper mixture of these three ingredients he becomes a self-styled expert forced to practice standardization merely at the direction of a regulation. He soon gives up on standardization. On the other hand, when all of these ingredients are harmoniously present one finds ideal growth in the Army aviator and exemplary performance that far surpasses today's measures of excellence.

The author is the former Chief of Flight Standards within the U.S. Army Aviation School during 1970-1972. He also organized and first commanded the Silver Eagles

Why should a particular group of aircraft inherently safer than other types produce a higher accident rate? And what role does standardization play?

SAFETY IN NUMBERS

WE ALL KNOW a certain amount of safety lies in numbers. An injured hunter stands a much better chance of reaching help if he has a companion with him. A flat tire on a lonely road becomes a temporary inconvenience if a sound spare is available. This safety-in-numbers concept has not been neglected by the aircraft industry. Examples include twin ignition systems, main and spare inverters, duplicate flight instruments, separate pitot and static air sources, and carburetor alternate air provisions. We can logically assume that doubling the number of powerplants propelling an aircraft and adding another pilot to the air crew will further enhance flight safety. That is how it should be. Unfortunately, this has not proved to be the case.

A study of twin-engine fixed wing mishaps in-

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USAAAVS

volving Army aircraft was completed in July 1973 by the U.S. Army Agency for Aviation Safety (USAAAVS). This study shows that the accident rate for these aircraft is unacceptably high. For a 12-month period ending in March 1973, for example, twin-engine fixed wing aircraft were involved in an average of 11.85 accidents per 100,000 hours of flight as opposed to a worldwide combined rate of 8.54 for all Army aircraft (active, National Guard and Reserve). These and other statistics coupled with additional significant data produced by the study prompted Major General William J. Maddox Jr., as Director of Army Aviation, to write: ". . . It is ironic because the bulk of fixed wing flight is performed in utility transport aircraft whose air operations are characterized by nontactical flying conditions between modern facilities under rigid control and in a radar environment. . . . The fault does not lie solely with the pilots; rather, it must be shared with supervisors, commanders and aviation officers. . . . " General Maddox specifically singled out the lack of effective standardization as a prime deficiency in our safety program.

Why should a particular group of aircraft inherently safer than other types produce a higher accident rate? And what role does standardization play? For the answers, let's examine two hypothetical in-flight emergency situations.

If the engine of a single-engine fixed wing aircraft fails shortly after takeoff, the pilot has no alternative but to set the aircraft down. If ample runway remains, good; he may be able to do this as easily as if he were making a normal landing. But regardless of the amount of runway left or any obstructions that may lie in his flight path, he has no choice. He must put the aircraft on the ground.

Now, consider a similar emergency involving a twin-engine fixed wing aircraft. The pilot must be quick to recognize the problem and identify the engine at fault. He must then evaluate the situation and decide whether or not he can safely abort the mission. If he is committed to flight, he must immediately shut down and secure the failed engine, aerodynamically clean the aircraft and adjust power on the remaining engine. While he is engaged in these tasks, he must also maintain control of his aircraft which is trying to yaw, bank and turn, and he must adjust trim as necessary. Even if he is fully capable of accomplishing all the above to perfection, he is not necessarily "out of the woods." If the aircraft is overloaded or improperly loaded, it may refuse to climb and may even become impossible to control.

In one accident that occurred in 1973, several of these cause factors were present. The aircraft was overloaded and the most aft center of gravity (CG) limit was exceeded. The passenger-cargo mission was combined with a pilot transition training flight conducted under marginal weather conditions. The attitude indicator on the right side where the instructor pilot (IP) was seated was inoperable and the pilot in the left seat had limited experience in this type aircraft. When one engine was shut down, control was lost and the aircraft broke apart in the air and crashed.

In another accident, the copilot of a U-21 inadvertently retracted the gear during landing when he attempted to raise the flaps.

A U-3 pilot failed to use a checklist and landed his aircraft gear-up.

An OV-1 was landed with the gear retracted during a simulated no-hydraulics landing. Although an IP was on board, no checklist was used.

A U-21 sustained major damage when it was landed 30 feet short of the runway. The copilot was attempting his first landing from the right seat. It was also the first time he had flown a fixed wing aircraft from this position. The pilot allowed the copilot to land the aircraft, knowing he lacked experience in flying from the right seat. In addition, the pilot violated the dash 10 checklist by setting the propellers at 1900 rpm during approach, limiting go-around capability. Ironically, neither aviator was able to perform a normal approach and landing during his postaccident checkride.

These are but a few examples of the 54 accidents and 97 incidents involving Army twin-engine fixed wing aircraft that occurred during a 2½-year period from 1 July 1971 through 31 December 1973. Obviously there is safety in numbers, but only if the crewmembers possess the knowledge, experience and skills required, and no violations of established procedures,

ARs and other pertinent directives exist. While a variety of cause and contributing cause factors inevitably led to each of the accidents described, most, if not all, of the mishaps could have been prevented by a concerted effort in a single area of accident prevention: standardization.

An effective standardization program would have made known any overgross conditions of exceeded CG limits. It would have prevented flight in marginal weather with an inoperable attitude indicator. It would have positioned the IP in the left seat and would not have allowed the combining of a passenger-cargo mission with a pilot transition training flight under the marginal weather conditions that existed. It would have ensured the use of checklists. And it would have made certain crewmembers were qualified to perform the functions assigned.

The importance of standardization has been recognized for years. Unfortunately, circumstances hindered the formulation of a genuinely effective program. Rapid expansion of Army aviation between 1965 and 1970, coupled with high operational requirements in Southeast Asia, forced the acceptance of a decentralized, major command or unit-level conceived and administered standardization program. While this program was certainly beneficial, it left much to be desired.

Following are a few examples of the lack of standardization that resulted:

1. AR 95-1 stipulates that complete engine stoppage or propeller feathering will be practiced only under VFR conditions at least 4,000 feet above the terrain while in straight and level flight, level turns, normal climb or normal descent.

• TRADOC Supplement to AR 95-1 allows the use of fuel or fuel mixture cutoff to simulate single-engine operations below 4,000 feet under certain conditions.

• The Instructor Guide for T-42 allows simulated single-engine failure to be given at any altitude by placing the mixture control in the idle-cutoff position. Flight training guides for other aircraft, such as U-8, U-21 and OV-1 utilize other methods for simulated single-engine operations in the traffic pattern.

2. Some units do not require pilots to use checklists under certain conditions.

3. Units vary in frequency of administering periodic standardization flight examinations.

4. Some units require the use of two pilots on all test flights involving multiengine aircraft while others consider one adequate.

It becomes clear that only a well-designed centralized standardization program formulated and administered jointly by all commands can be successful in preventing mishaps. It must be a program in which representatives of all types of aviation units can put their heads together, examine all problem areas, mutually determine best solutions and then wholeheartedly support and administer it. We now have a program such as this.

AR 95-63 (Army Aviation Standardization and Instrument Program) went into effect on 1 September 1973. In brief, the regulation contains procedures for managing the U.S. Army flight standardization program and includes all aspects of aviator qualification and proficiency in aircraft, instrument and visual flight, tactics and safety.

This program is designed to enhance combat effectiveness, aviation safety and professionalism by means of standard procedures and techniques used in operating Army aircraft.

The responsibility for accomplishing Army flight standardization rests with standardization boards established at HQDA, major Army commands, major subordinate commands and other subordinate commands as appropriate. These boards must be active, provide positive guidance, monitor programs, and must have a means of conducting business even when they are not in formal session. While board members are responsible for establishing general policy guidance for U.S. Army flight standardization and aviation safety programs in accordance with AR 95-5, and for reviewing activities of subordinate flight standardization boards, the responsibility for conducting board affairs between meetings rests with the Director of Army Aviation. Any actions taken are then subject to approval by the full board at the next regular meeting. The structure and individual areas of responsibility of each board as well as all administrative procedures, requirements, etc., are defined in AR 95-63.

Although an effective standardization program will mutually benefit all areas of aviation, it is especially essential to the health of twin-engine fixed wing operations. In essence, it will ensure that all chefs prepare the best recipe for safety in the same manner without substituting ingredients or varying required amounts, consistently producing a product of the highest quality. Without a program such as this, we will find it difficult, if not impossible, to expand our safety program above its present plateau. Its success depends on you.

The Ohio Army National Guard is actively conducting an instrument training program designed to include a new twist in flight training

A New Twist

Captain John S. Martin

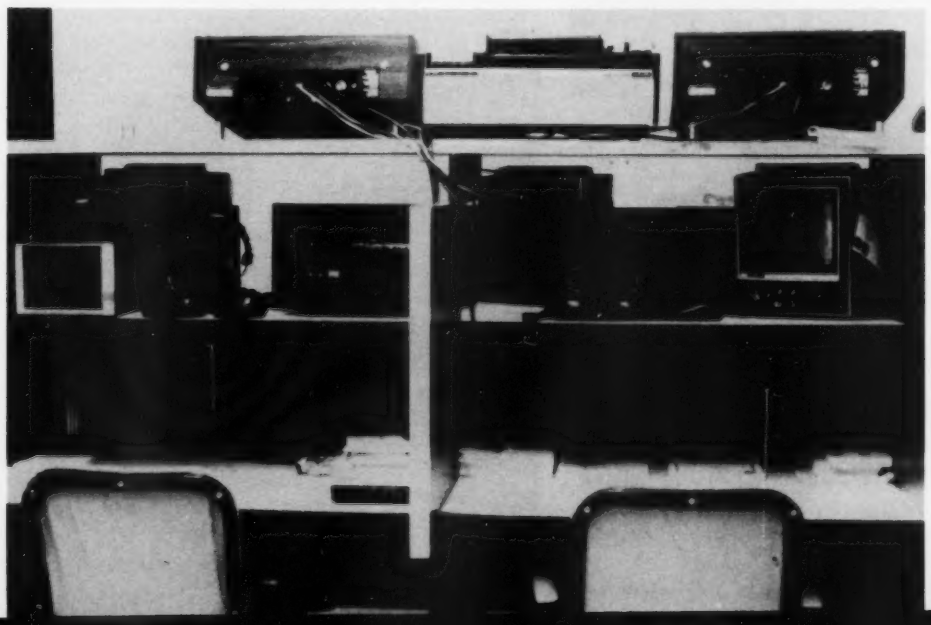
AVIATORS IN THE Ohio Army National Guard (OHARNG) are being challenged by several new and demanding but exciting requirements in 1974, including obtaining an instrument rating, transitioning into first line Army aircraft (UH-1, OH-58) and familiarization and qualification firing of aircraft armament systems. Hard at work in assisting OHARNG aviators in meeting these requirements is the Ohio Army Aviation Support Facility #2 (AASF #2).

Located at Ohio State University's airport in Columbus, OH, the third busiest airport in the state, AASF #2 supports 95 aviators and 57 aircraft on a full-time basis. These aviators and aircraft are assigned to such diverse units as HHC 16th Engineer Brigade, Troop D (Air) 1/238th Cavalry, 1416th Transportation Company (AM) (GS), and the 50th MP Group.

What is AASF #2 doing to support instrument training? AASF #2 is actively conducting an instrument training program, which was designed to include a new twist in flight training. At first glance, the program appears similar to other instrument training programs, with synthetic trainer (link) flights and in-flight training in the UH-1. The program conducted at AASF #2 goes into much greater depth, though, and includes five phases, each phase being successive and prerequisite to the next:

A. Phase I—Ground Training
   (1) 16 hours of synthetic trainer flight
   (2) 10 hours of video tape instrument training programs
   (3) 43 instrument training programed texts
B. Phase II—Flight Training
   16:30 hours of basic instrument flight
C. Phase III—Flight Training
   23:30 hours of advanced instrument flight
D. Phase IV—Examination
   100-question written instrument examination
E. Phase V—Examination
   Instrument evaluation flight check

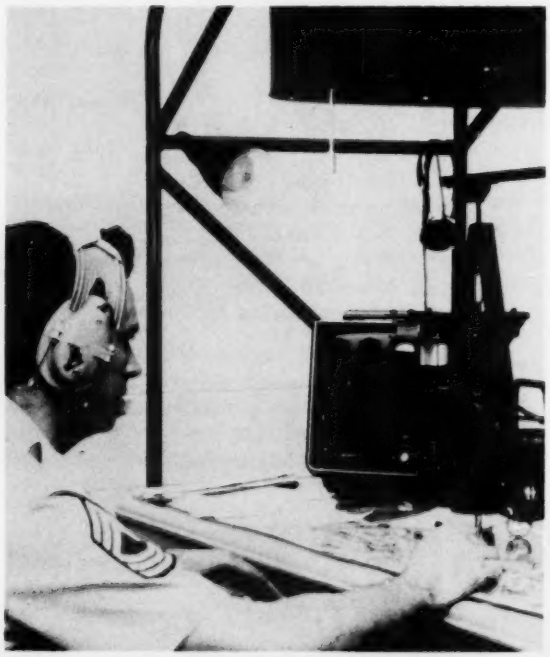
Phase I of the program was designed to provide each aviator with a solid foundation of procedural knowledge and skill, at maximum cost effectiveness, prior to commencing in-flight training. Compared to in-flight training, optimum use of AASF #2 ground



Carrels in learning center

training facilities provides an equalized level of training by capitalizing on the benefits inherent in audio-visual training techniques.

Each aviator's ability, flight background and experience are recognized, and he is permitted to proceed through the program at his own best learning rate. His progress is closely monitored throughout all phases by an instructor pilot.



Synthetic trainer instructor at desk. Note 9-inch television monitor displaying trainer's flight and navigation instruments

What is this "new twist"? AASF #2 has installed a complete Learning Center to provide for full integration of audio-visual training techniques into Phase I. The Learning Center consists of:

• Four individual carrels, each equipped with a 9-inch television color monitor, a video tape player and a headset. The carrel is used by the aviator to view the video tape instrument training programs and complete programed texts.

• A "Rover" video recorder camera mounted in the synthetic trainer which views the instrument panel of the trainer and records any or all portions of the flight, both audio and visual.

• A 9-inch television color monitor located on the synthetic trainer operator's desk, which constantly portrays the trainer's instrument panel through the camera discussed above.

• A 17-inch television color monitor and video tape player mounted on a mobile stand to permit presentation of video tape training programs to larger groups.

• Ten hours of video tape instrument training programs.

How does all this work? The video tape instrument training programs and programed texts prepare the aviator for each synthetic trainer flight. The programs and texts have been designed to supplement and reinforce each other in preparation for a flight. Prior to the flight, the aviator completes the assigned texts and views the appropriate program in a carrel physically located in close proximity to the trainer. He then enters the trainer and completes the assigned flight. Upon completion of the flight and

Student viewing instrument training video tape in learning center carrel

CPT Martin is a flight instructor with the Ohio National Guard. He is a graduate of the University of Michigan and has been an instrument IP at Ft. Rucker. He holds FAA instrument ratings in fixed and rotary wing aircraft, and is a rotary wing instrument examiner.

the debriefing by the instructor, the aviator returns to the carrel and reviews the video tape program, which provides a standard against which he can compare his performance. This technique provides a strong reinforcement to the programed texts and the trainer flight, and results in a higher degree of insight and retention.

The "Rover" video recorder in the synthetic trainer provides a means for the aviator to see and hear errors made during the flight, and is an excellent aid to the instructor in the conduct of a thorough and meaningful debriefing. The "Rover" records the readings of the flight and navigation instruments and during the postflight debriefing the instructor plays back the recording while pointing out errors, causal factors and possible corrective actions. The quality and depth of the debriefing maximizes the training received from the flight.

What is the cost of this type of training? The cost of 1 hour of Phase I is approximately one-tenth of the cost of 1 hour of Phase II or III. Experience has shown that the integration of audio-visual training techniques into the instrument training program at AASF #2 has resulted in a reduction of actual in-flight training required for an aviator to obtain an instrument rating by at least 5 hours. In terms of cost effectiveness, the audio-visual training equipment has significantly reduced the per hour cost of instrument training. However, a cost analysis that amortizes the cost of obtaining the audio-visual equipment over just the life span of the instrument training program is not meaningful. The productive usefulness of the equipment is limited only by its physical life expectancy.

What are other uses for the audio-visual equipment? The annual instrument qualification renewal, the annual standardization flight check, and continuing maintenance personnel training are only three instances of audio-visual equipment application at AASF #2. Experience has shown that an aviator who completes the standardization refresher program, which includes an audio-visual presentation of material covering aircraft preflight inspections and

Synthetic trainer. Note modifications to accept video tape camera and recording unit

normal and emergency operating procedures, requires a minimum of 1 hour less in-flight preparation for the annual standardization flight check than the aviator who does not undergo any prior training. Similar benefits have been realized with regard to aviators preparing for the annual instrument qualification renewal flight.

The instrument training program at AASF #2 with its new twist has been extremely successful, both in terms of producing professional, well-trained instrument rated aviators, and in achieving this goal at minimum expense to the taxpayer. The audio-visual equipment which has given the program its new twist will continue to be a cost effective and efficient training vehicle, and an integral part of the total aviation training program at AASF #2 for years to come.

In the area of standardization, we have been adding one and one and getting three. Recently, CPT Robert G. Deppey, state aviation safety officer for the Arizona Army National Guard, disproved this hypothesis

one and one make two

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Directorate for Plans, Operations and Education
USAAAVS

EVERY SCHOOL KID who ever waded through fractions knows that the whole is equal to the sum of all its parts. In Army aviation, we sometimes forget this not-so-profound fact. Take the area of standardization, for example. For years we have been adding one and one, and getting three for an answer. Worse yet, we seem to have accepted this figure as being correct. Recently, however, personnel of the Arizona Army National Guard disproved this hypothesis. Here's what happened.

Every Army outfit sports at least one "brain," and the Arizona ARNG has theirs. Affectionately and with respect, they've dubbed him Egghead. One day, after he had finished reading Einstein's Theory of Relativity and discreetly making some minor corrections, Egghead turned to the aviation safety officer and said, "How about getting the boys together. I've got something that may interest them." When all the aviator types were rounded up, Egghead, who is not one to beat around the bush, stood before them and said, "Men, this may come somewhat as a surprise to you, but one and one make two!" That was all it took. Sheer pandemonium broke loose. Everyone in the unit knew that one and one made three. Egghead had finally crossed that narrow dividing line. He had flipped.

"Look!" he said after order was finally restored. "We fly Hueys here, right?"

"Right!" came the response.

"Okay, who sits in the left seat?"

"The copilot!"

"Good! Very good!"

"Now, who sits in the right seat?"

"The pilot!" was the enthusiastic reply.

"Excellent! That makes *one* in the left seat and *one* in the right seat. Now, how many aircrewmembers do we normally have all total?"

"Three!" came the answer without so much as a pause.

"Absolutely correct!" replied Egghead. "What does that tell you?"

"One and one make three," blurted out a voice from the rear.

"Wrong!" Egghead fired back. "Think hard. Who else do we have on board?"

No one spoke. The men just looked at each other. At length, a somewhat unsteady voice questioned, "The crewchief?"

"On target!" retorted Egghead. "The crewchief! He makes the crew complete.

"Let's say we have a new pilot assigned to our unit and he is scheduled to fly with one of our regulars. Although the two have never met before, chances are good that each will know his duties and those of his partner. Why? Because the pilot's role has been fairly well standardized. While a centralized standardization program has only been in effect since September 1973, a decentralized one has been in operation for years. But what about the crewchief? Let's assume he is also new to the outfit. Does he know what is expected of him? Can the pilots depend on him to perform certain functions routinely and special ones automatically as the need arises? Or do they simply assume he will do so? Obviously, this type of crew arrangement could lead to problems—some of them serious. . . . "

"Aw!" a voice broke in. "The crewchief's job is cut and dried."

"Is it?" queried Egghead. "The pilot has a dash 10—a big, thick dash 10—that spells out his duties and areas of responsibility for safe flight, including normal and emergency procedures. Pilot standardization simply divides these duties between the pilot and copilot so that each knows what is expected of him by the other under any given set of circumstances. But what does the crewchief have? A simple maintenance guide. That's all.

"What is he supposed to do if the engine fails, particularly if passengers are on board? Or if the engine catches fire? What are his responsibilities immediately following a survivable crash?

"Does he know all the hand signals he may need to use? Better yet, will the pilots understand them? How would you like it if your crewchief suddenly bolted and ran from your aircraft after waving you some unintelligible signal? Maybe he just spotted some long lost relative; or maybe your tail is on fire. Wouldn't it be nice to know which?

"These are more than mere suppositions. Passengers have been injured and killed during crash landings because they weren't strapped in. And we have lost personnel from fire because open cabin doors were not closed after an engine burst into flames.

"Gentlemen, the list is a long one. Discrepancies that resulted in injuries and deaths would not have existed if specific flight duties were taught all crewchiefs and procedures standardized for entire flight crews."

As Egghead took a breather, the men began to mumble: ". . . Makes sense . . . Sure would hate for some heavy crate to break loose and shift in flight because it wasn't properly secured . . . I remember running into some weather once and an improperly stored briefcase clobbered one of my passengers . . . It would be a relief to know my crewchief was handling everything aft of the cockpit, especially during some emergency . . ." One young fledgling filled with renewed enthusiasm was excitedly nudging his neighbors and saying: "Hey! One and one make two; two and one make three. How about that!"

"Egghead, you've done it again," a voice blurted out. "You've got a good idea."

"Hold it a minute," Egghead replied. "It's not my idea. I've served in several units that had some type of crewchief standardization program in progress, and it helped a lot. But it only helped those units, and it was really only partly efficient. I didn't realize this until a little while ago."

"You mean Einstein? Everything being relative to something else?"

"Something like that . . ."

"Wait a minute," someone broke in. "You're not fixing to talk calculus to us, are you?"

"No, no. Nothing like that." With those words, Egghead brought out a paper bag he had been holding behind him. He reached one arm into it and pulled out an ordinary clock. "As you can all see, the sweep second hand is moving and the clock is running. If you look closely, you may even be able to see the minute hand advance one increment each time the second hand completes a revolution. The two are working in perfect harmony with each other. Now let's look at the hour hand. It should advance from one numeral to the next each time the minute hand makes one complete revolution—and that's where the problem comes in." Glancing at his wrist watch, Egghead continued: "Right now this clock shows the correct time. But the hour hand has somehow gotten

loose and every now and then it slips on its shaft. When this happens it may indicate 6 o'clock, for example, when in reality it may be 7 o'clock. It may run faultlessly for 2 or 3 days before the hand slips, or the hand may slip within the hour. Obviously, as it is, the clock is not dependable. That's why I have it with me. I'm taking it to the shop on my way home.

"Sure, I can still use it to accurately time some short event that's completed in a matter of seconds. Or, I may use it to time a 3-minute egg. But as long as all three hands do not constantly maintain a proper relationship with each other, I can't depend on it for the correct time."

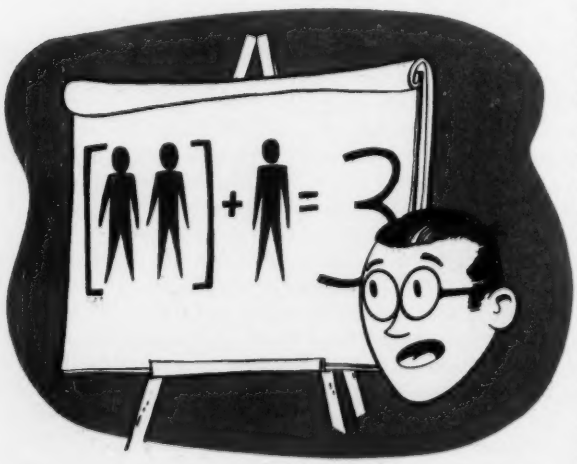
Everyone got the message. It was the same with an aircrew. Two might work in perfect harmony. But for maximum efficiency, dependability and safety, all three had to perform their specialized functions properly and at just the right time. Coupled with pilot standardization, a truly effective program must not only standardize the crewchief's responsibilities and do this for *all* crewchiefs who are part of aircrews, but also it must integrate individual crewmembers into a single crew. In reality, it must be two programs in one—an individual and a crew standardization program.

"Mathematically, it's really quite simple," Egghead continued. "One and one make two; it takes two and one to make three."

"Hold on there!" a noticeably irritated voice barked out. "You promised not to talk calculus."

"My apologies," replied Egghead, then went on to ask: "What do you folks think? Shall we get together and give it a try?"

Maybe the noise of a nearby helicopter being revved up drowned out his voice and made some think he had asked: "What do you folks drink? Shall we get together and get high?" In any case, they responded with a unanimous show of hands. As a result, the Arizona ARNG now finds itself in the midst of establishing and testing such a program—standardization, that is.



While all the events narrated didn't happen exactly as stated, they do show the reasoning that led to this program. The ultimate goal of the Arizona ARNG is to administer an annual checkride to the crew in addition to the individual checkride provided the aviator. Toward this end they have completed a proposed checklist, a training record and a plan of instruction. SP6 John Keith, a tech inspector with the 997th Aviation Company, who is employed as a fulltime technician mechanic, assisted Captain Deppey, the Arizona ARNG aviation safety officer, in preparing this material. He has served on active duty with the Marine Corps as a crewchief on CH-34s and CH-53s and was a NATOPS instructor before becoming a guardsman.

The crewchief training record is similar to that used for pilots. It includes issue of flight gear, local orientation of both shop and flying areas, ground school training, flight line procedures and inflight training.

The checklist shows specifically what the crewchief is required to do before flight, his duties during start, runup, in flight and after landing right up to the postflight. Emergency procedures, hand and arm signals, emergency distress visual signals and various items of information crewchiefs need to know are included. Extracting this material from numerous publications and embodying it in a single checklist also makes it readily available for reference.

The POI is based on the crewchief's being fully MOS-qualified and is designed as follow-on type training. When possible, all ground school subjects are to be conducted jointly for pilots and crewchiefs, setting the stage for total crew training. Subjects include a general review of TMs, logbooks and other related publications; survival and first aid; search and rescue; safety; flight duties; and passenger procedures, with emphasis on weight and balance, aircraft performance charts and emergency procedures. Additional training is to be provided crewchiefs in the areas of ground handling, fueling and servicing, inspections and limited troubleshooting.

The Arizona ARNG Crewchief Standardization Program survived the state murder board and is scheduled for trial operation by July 1974. If it proves successful, it will be submitted for consideration by the National Guard Bureau and presented to the Department of the Army.

Orientation Ride or Thrill Flight ?

A UH-1B TOOK OFF with a crew of two and five passengers. The mission was an orientation flight for the passengers. They were all seated across the rear seats of the aircraft and were buckled in. The crewchief remained on the ground to organize the next group of passengers.

After takeoff, the pilot made a wide climbing right turn over a narrow neck of a reservoir and a heavily wooded shoreline on the east side of the reservoir. He continued straight over the water, climbing out over the mess area located on a narrow neck of land between the west edge of the inlet and the main body of the reservoir. He continued almost due west over the main body of the reservoir and at this point was in full view of individuals in the landing area. The aircraft slowly descended on a constant heading (approximately west) until touching the water with the front part of the skids, and apparently became airborne again for a short distance. It then touched the water again with the front of the left skid. The aircraft tumbled forward, the main rotor struck the water and the rotor head was torn from the transmission. It continued to a completely inverted position and the entire tail boom was torn off. The crew compartment was completely ruptured and both crewmembers were thrown clear of the wreckage. Two of the passengers' seat belts were torn loose by the impact and these passengers were thrown clear also. Two more passengers released their seat belts and exited the aircraft before it sank.

Two outboard boats were on the shoreline about one-third of a mile away and reached the scene quickly. The two crewmembers and four of the passengers were picked up within 3 minutes after impact. The fifth passenger could not be located and the aircraft sank in approximately 75 feet of water.

All survivors were transported to an Army hospital by road vehicle. Both crewmembers received major injuries, four passengers received minor injuries and one passenger was killed.

The pilot stated, "I flew about 30 to 35 feet over the trees and then started a lefthand turn. . . . After completing the lefthand turn, I came back from over the trees and dipped down a little and back up over the mess area, and then we went out over the water to begin a shallow approach into the helipad. . . ."

A passenger said, "Upon clearing the trees over the camp area he swooped down close to the water right there on the left side of the mess area, traveling really close to the water and, just before reaching the trees, he swooped back up again, apparently, I don't know, trying to give us a thrill or something. . . ."

The aircraft accident investigation board carried in their findings the following causes:

• The aircraft was operated at such an altitude as to allow little or no reaction time in the event of an emergency.

• The pilot became disoriented, possibly as a result of the following: a binding cyclic, rpm warning light illumination, or both, thereby causing a diversion of attention to inside the cockpit. When the pilot tried to refocus his attention to the outside, he was unable to determine his height above the water due to extremely hazy conditions, glassy water surface and a loss of visible horizon. These three conditions are well known factors that make it extremely difficult for proper depth perception. Aircraft historical records revealed that the aircraft had been written up for an aft cyclic bind and an illuminating rpm warning light. These facts tend to substantiate the possibility that cyclic binding or rpm warning light illumination could have occurred.

The board recommended the following:

• Strict adherence to altitude restrictions.

• A preplanned route, to include altitudes, for all orientation flights.

• A thorough briefing be administered to the passengers by the crew.

• Orientation flights over unsuitable terrain and during periods of marginal weather conditions be avoided.

• The importance of the review of Form 2408-14 prior to flying an aircraft be emphasized.

AIMS

Prepared from information published by U. S. Army Aviation Systems Command

ON 2 JULY 1975, a new era in air traffic control will begin. On that date, more than 100 terminals and 20 Federal Aviation Administration (FAA) en route air traffic control centers will be equipped to automatically interrogate and track aircraft using radar beacon transponders with altitude reporting capability. With few exceptions, aircraft using high density terminals or controlled airspace above 12,500 feet will have the new transponders equipped not only to identify the aircraft at each sweep of the radar antenna but also to report the current altitude in 100-foot increments. The effect of this new equipment is expected to rival that produced by the introduction of radar itself more than 30 years ago. And the heart of the system is the AIMS altimeter.

This compact unit is as sophisticated as the acronym that designates it; for AIMS is, in reality, an acronym of acronyms. The "A" stands for Air Traffic Control Radar Beacon System (ATCRBS); the "I" for Identification Friend or Foe (IFF); "M" represents the Mark XII identification system; and "S" stands for system. Its inception dates back to "Project Beacon" in 1961 when President Kennedy directed the FAA to conduct a scientific, engineering review of our aviation facilities and related research and development, and to prepare a practicable long range plan to ensure efficient and safe control of all air traffic within the United States.

In 1963, the Department of Defense (DOD) joined with FAA in the implementation of ATCRBS. The DOD AIMS program satisfies two primary requirements: improved air traffic control (ATCRBS) and a secure military identification system (Mark XII). This represents the first major equipment subsystem program involving tri-service implementation managed by a single department. DOD designated the Air Force as Executive Agent. Other participating organizations include the Army, Navy, National Security Agency (NSA) and the FAA.

Within the Army, the U.S. Army Electronics Command (ECOM) has command responsibility for planning and implementing the AIMS program. Overall management is assigned to the DOD AIMS System Program Office (SPO) within the Deputy for Communications and Navigation at the Electronics System Division, U.S. Air Force, L. G. Hanscom Field, Bedford, MA. All services and agencies involved in the AIMS program furnish representatives to the SPO and AIMS Working Groups.

The AIMS system consists of IFF transponders, IFF interrogators, altitude computers, servoed altimeters, controls and other associated equipment. Although interrogators are included in most AIMS-equipped ground and surface sites, in tactical ground and surface systems, and in certain special task aircraft, they may or may not be associated with, or slaved to, a primary radar. A typical AIMS interrogator subsystem consists of a receiver-transmitter, synchronizer, data processor, displays, controls, antennas and a KIT-IA/TSEC crypto computer.

The transponders are used primarily on aircraft and perform the reply or "answer" function to the interrogators. A typical AIMS transponder subsystem consists of a receiver-transmitter, control, in-flight test set, associated mounts, antenna system and a KIT-IA/TSEC crypto computer. An AIMS altimetry subsystem, working in conjunction with the transponder set to provide altitude reporting, would include a pitot-static system and one AAU-32/A self-contained altimeter/altitude encoder.

AAU-32/A Altimeter. The AIMS altimeter is designed to let an air traffic controller know the altitude of the aircraft while giving the pilot a digital readout on the indicator. It is a self-contained unit that consists of a precision aneroid altimeter combined with an altitude encoder. Altitude is shown on the altimeter by a 10,000-foot counter, a 1,000-foot counter and a 100-foot drum. A single pointer indicates hundreds of feet on a circular scale, with 50-foot center markings. Below an altitude of 10,000 feet, a diagonal warning symbol will appear on the 10,000-foot counter. A barometric pressure setting knob is provided to adjust the desired altimeter setting in inches of mercury (Hg). A DC-powered vibrator operates inside the altimeter whenever aircraft power is on. If power to the altitude encoder is lost, a warning flag placarded "Code Off" will appear in the upper left portion of the instrument face, indicating that the altitude encoder is inoperative and the system is not reporting altitude to ground stations.

The altimeter is designed specifically for aircraft

ALTIMETER

Ted Kontos
Directorate for Plans, Operations and Education

that do not require static pressure source correction. The instrument is driven solely by atmospheric pressure acting on dual aneroid diaphragms. No electrical power is needed to operate the pneumatic mechanism. The encoding feature of the altimeter is provided by means of an optical encoder using light-emitting diode light sources and photo transistor detectors. A code disc, driven by the main shaft of the altimeter mechanism, rotates between the light sources and photo detector array to provide the encoded information to the transponders. By loosening the zero set locking screw, the knob on the front of the altimeter can be used to re-zero the encoder as well as the altimeter.

At ambient pressure, the altimeter should agree within ± 75 feet of the field elevation when the proper barometric pressure setting is set in the altimeter. Should an error in excess of 75 feet exist, the altimeter should not be used for IFR flight.

AN/APX-72 IFF Transponder. With required auxiliary equipment, the transponder enables the aircraft to identify itself when challenged by proper signals from appropriate radar interrogation equipment at land bases, aboard ships or in other aircraft.

The system also includes the following functions of air traffic control: altitude reporting, tracking and identification, and emergency reporting. It can permit an aircraft to be discriminately identified in the presence of numerous other aircraft, and can transmit a special coded signal known as an emergency reply.

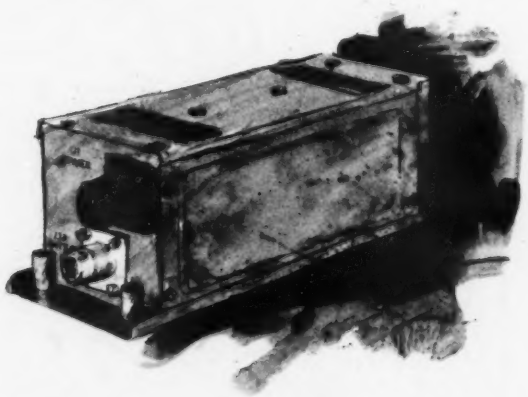
C-6280 Control Set. The control set serves as the master control panel for the IFF/AIMS system. On it are all operational controls for the transponder, computer and airborne test set, except for the mode 2 code setting controls which are located on the transponder.

KIT-IA/TSEC Computer and IFF Caution Light. This mode 4 computer is a secure identification unit which will generate a reply to an appropriately coded interrogation. Depending upon operational, maintenance and security considerations, the computer may be installed before and removed after each flight, or it may normally remain in the aircraft. The codes, which must be inserted by maintenance personnel prior to flight, are changed daily. Code A covers the present 24-hour Greenwich time period and Code B the following time period, if operationally required. The computer will automatically erase its code (zeroize) when power is removed, providing the landing gear has been retracted or the contact switch activated, or when ZERO is selected on the C-6280 control set. It is also possible to mechanically lock the code by means of the HOLD function in the C-6280 so that it will not zero under certain conditions. If the computer door is opened, it will automatically zero the code. The computer also contains a built-in self test circuit. An IFF CAUTION light, normally located on an aircraft panel near the pilot (or other selected crewmember), illuminates whenever the IFF CAUTION light circuitry detects an inoperative mode 4 capability, provided that (1) the KIT-IA/TSEC computer is installed, (2) the aircraft power is on *and* (3) the IFF MASTER switch is not OFF. Specific discrepancies monitored by the IFF CAUTION light circuitry are: (1) mode 4 codes zeroized, (2) transponder failure to reply to proper interrogation and (3) when the automatic self-test function of the computer reveals a faulty computer.

TS-1843 Airborne Test Set. The airborne test set provides a means of performing an in-flight check of the AIMS installation. The two functions used in performing system evaluation are the test mode and monitor mode. System performance evaluation includes receiver sensitivity and frequency, transmitter power output and frequency, decoding, reply framing pulse spacing and antenna voltage standing wave radio (VSWR). In the test mode, interrogation pulse pairs for the selected mode are generated in the test

set and fed to the transponder. If the system performance is within tolerance, the TEST light illuminates. Not all AIMS installations incorporate a TS-1843 test set.

Over the past 20 years, radar has been a primary tool for separating traffic. Any sizable target in the sky will return or reflect energy beamed out into space during the radar transmitter's antenna sweep, and this reflection can be shown on the radarscope as a blip of light. With a grid superimposed on the scope, there is no problem about locating the target horizontally from the radar station, and eventually identifying it precisely, with the assistance of radio communications between pilot and controller. When few aircraft are in an area, traffic separation is quite simple, but when the traffic is heavy and consists of a mixture of aircraft with many different speeds and degrees of sophistication, safe separation can become a difficult chore for the pilot as well as for the controller. The latter, who often is dealing with half a dozen or more aircraft at the same time, must remember the altitude as well as the intentions of each flight. The pilot, on the other hand, must keep to his assigned altitude as well as follow specific headings or vectors while controlling his aircraft and proceeding to his destination.



With automatic altitude reporting equipment in the aircraft, and the new automatic radar tracking systems installed on the ground, these tasks are greatly simplified. The aircraft can be tracked automatically on radar from the moment it enters a controller's sector. Its identification number will appear alongside the position symbol, together with altitude. The controller will be able to tell at a glance the relative distances of one aircraft from another, with regard to altitude as well as azimuth. Aircraft at altitudes that he is not concerned with can be removed selectively from the scope, allowing him to concentrate on the traffic for which he is responsible.

The pilot's task is also simplified in that he is no longer obliged to respond to frequent radio inquiries as to altitude and position, thereby giving him more freedom to concentrate on his cockpit chores and to look out for other aircraft. There is less chance of pilot error stemming, for example, from his not holding his assigned altitude, since altitude changes can be quickly indicated to the controller on the scope. Other advantages to be derived from automatic altitude reporting equipment include:

• *Less congestion on the radio frequencies.* With fewer routine transmissions between pilot and controller regarding altitude and identification, the frequencies will be more available for other essential interrogation, clearances, clarification of vectors, emergency calls, etc.

• *Greater safety in case of radio failure.* If the radio fails, but there is still power to activate the transponder, a special code setting on the transponder control box will immediately inform the controller of the problem, and he will still be able to identify the aircraft on his scope, vector other aircraft away from it, and most importantly, he will know the aircraft's altitude.

• *Greater vectoring flexibility.* In an emergency, when an aircraft needs to be brought in for a landing in the shortest possible time, the controller can determine at a glance the altitudes and flight paths of all the aircraft in his sector and plan the shortest landing path for all aircraft, especially distressed aircraft, in a much shorter time.

• *Fewer delays in flight.* In bad weather and at busy peak periods of air traffic, eliminating the factor of unknown altitude will keep the flow of traffic moving much more efficiently and safely than has been previously possible.

• *Error reduction.* The chances of human error are much reduced when the altitude and identity can be displayed continuously on the scope, rather than maintained manually or mentally. Correlation studies conducted by the agency have found that the altitude automatically displayed on the controller scope corresponds with indicated altitude in the cockpit as much as 99.6 percent of the time.

VIP Kits

The pilots in my unit would like to see an article in the AVIATION DIGEST *concerning safety hazards involved during a mishap when a VIP kit is installed in the aircraft. The kits we use are vinyl-covered foam rubber 2 inches thick. They are used to pad the passenger seat and back. I do not like to use them because I consider them a fire hazard in addition to being a cause factor of spinal type injuries during a mishap. Please send me information concerning the use of these kits.—ASO*

USAAAVS mishap files show a singular lack of reported data with regard to the so-called VIP kits. Since there is no mishap experience data to draw upon and you have not indicated the particular type, model and series of aircraft or the manufacturer of the VIP kits, perhaps a general discussion of the matter would be beneficial. The following is based on information contained in USAAMRDL TR 71-22, Crash Survival Design Guide, Ft. Eustis, VA.

The amount of slack in a restraint system can affect human tolerance to a given acceleration pulse. This slack can be caused by things such as loose seat belts and shoulder harnesses and by seat cushions which compress and then rebound excessively upon loading, as in a mishap. In general, the less elasticity in the link between the occupant and the seat, the greater the occupant's tolerance to an abrupt acceleration. Just as a loose restraint can result in an occupant's receiving a magnification of the accelerative force applied to a seat, a thick soft seat cushion may cause the same phenomenon. In a mishap, the inertia of the occupant will cause him to maintain a near constant velocity, independent of the decreasing velocity of the seat, until the slack in the restraint system (i.e., seat cushion) is taken up. As this point is reached, the velocity of the occupant is abruptly reduced to that of the seat at a relatively high g level, even exceeding that of the seat. This is often referred to as "dynamic overshoot." Generally, cushions should be used for comfort only. The thickness for a properly contoured cushion should not exceed 1½ inches.

If you have a question concerning aviation accident prevention, write to
CO, USAAAVS
ATTN: Orval Right
Fort Rucker, AL 36360

Indeed, the vinyl coverings and foam rubber cushions will burn and produce smoke and toxic gases as will various other organic compounds used in the aircraft. Surely we do not wish to add hazardous materials to a fire. When a crashworthy fuel system is installed in an aircraft, however, the materials used within the structure are less important from the standpoint of fire due to the fact that fire is less likely to occur.

To summarize, then, for increased crashworthiness it is important that:

- Seat cushions be used for comfort only and be limited to a maximum thickness of 1½ inches.
- Crashworthy fuel systems be installed to reduce the chances of postcrash fire.

Disconnect Cannon Plug?

I need a positive statement concerning the disconnecting of engine electrical control cannon plug at the fire wall when the engine chip detector light illuminates. The IPs here consider it to be a safe act. I feel this procedure is not in the dash 10 and therefore this act should not be accomplished. I need something from somebody saying it will be done.—Company commander

The practice of disconnecting the cannon plug in flight is an unsafe act and contrary to published flight and maintenance procedures. Flight crews should adhere to published procedures in the operator's manual when a chip light illuminates.

When a chip light illuminates the crew should be primarily concerned with landing the aircraft as soon as practical. Determining the cause and source of the chip light should be accomplished after the aircraft is safely on the ground. To do otherwise is a violation of paragraph 4-71, chaper 4, TM 55-1520-227-10, Emergency Procedures.

Visor-Mounted Hood

I'm concerned with preventing midair collisions during instrument training. Simulating under-the-hood conditions by covering the pilot's windshield halfway to the top with cardboard obstructs the observer's visibility and is a good way to become a statistic.

We've eliminated some of the upper left-hand corner of the cardboard so the observer pilot has a small space to look across and through the right windshield. We haven't found a solution for the cover in the chin bubble that could be hazardous in a forced landing situation, where you want all the visibility you can get. A few years back when I first started instrument training in civilian aircraft, we had tinted plastic and goggles. The plastic would stick easily to the windshield by surface pressure and anyone could see through it as long as they didn't have on the goggles. The goggles gave perfect vision within the cockpit and there was no hood to block part of your vision.

I've tried without success through general aviation supply houses to obtain these kits. I'm wondering if you might have some powers that could come up with a source for this equipment. Perhaps if it isn't too expensive, "Uncle" would put it into our inventory and regular supply channels.—Detachment commander

The tinted plastic and goggles to which you refer were once in the Army and the Air Force inventory. However, they were withdrawn for several reasons, primarily money, and there is little probability that they will be returned.

Army regulations do not require covering the pilot's windshield and chin bubble. The Air Force discourages the use of restriction devices and the Navy has found that a visor-mounted hood is satisfactory in meeting training requirements. Additionally, the use of visual obstructions to limit the field of vision of the safety pilot could constitute negligent conduct for which the government would be liable in the event of an accident between military and civilian aircraft.

USAAAVS recommends that only a visor-mounted hood be worn and that devices which restrict the visibility of the safety pilot not be used.

If you have a question about
personal equipment or
rescue survival gear, write PEARL,
USAAAIS, Ft. Rucker, AL 36360

PEARL'S

Personal Equipment & Rescue/Survival Lowdown

Serviceability of Nomex Shirt and Trousers

Five aircrewmembers' worn Nomex uniforms were sent to the U. S. Army Natick Laboratories for a fire retardant evaluation. These uniforms were considered by the users to be worn to the point that they were unserviceable because of their questionable capability to minimize injury from high intensity heat. The laboratory was also questioned whether guidelines had been established for use at a unit level to judge the serviceability of the uniforms after a long period of wear.

Fabric from the Nomex uniforms was tested to determine whether the fire retardant qualities or resistance to thermal transfer had been reduced through wear. The test specimens were selected from worn areas—knees and elbows—considered to have received severe wear. These selected materials were tested to determine weight, thickness, porosity and fire retardancy.

Nine of the 10 specimens showed properties within the range encountered in new materials, so there was no loss in fire retardation.

One pair of trousers showed loss in serviceability because extreme shrinkage had occurred, with resultant loss in air permeability and nearly a 50-percent increase in weight. Such changes would result in marked discomfort to the wearer and the garment might be classed as unserviceable since it no longer would be in its original designated size. Detailed examination of the fabric indicated the likelihood that the fabric was from the first production lots and had been delivered before inclusion of the fabric specification requirements for autoclaving, a method to prevent shrinkage and ensure fabric stabilization through 15 or more launderings.

Guidelines for maintaining Nomex are provided in chapter 7, TM 10-8400-201-23, "General Repair Procedures for Clothing and Individual Equipment." Additional guidelines are contained in AR 32-15, "Clothing and Textile Material Classification and Inspection." However, the criteria for serviceability is based primarily upon repair costs or loss of military appearance of the Nomex.

Comparing the test results with similar tests of lighter weight Nomex fabrics, it is likely that a thickness measurement of 0.012 inches or less at 0.6 pounds per square inch (psi) in the standard fabric would indicate a loss in fire protective qualities.

Protective Clothing for POL Handlers

Our unit has experienced difficulty in attempting to provide protective clothing and equipment for POL handlers. Could you advise us what clothing is authorized and how it can be procured?—ASO

The U. S. Army Agency for Aviation Safety (USAAAVS) does not have data upon which to make a recommendation to the proponent of this clothing, as refueling accidents are classified as ground rather than aircraft accidents.

AR 670-5 prescribes uniform regulations for members of the Army. Other documents also authorize additional protective clothing and equipment to certain individuals when hazardous duties or conditions are involved. These documents are: Common Table of Allowance (CTA) 50-900, dated 15 November 1973; AR 700-84; CTA 906; CTA 60-18; SB 8-100; and SB 700-50. DA Pamphlet 385-3, dated 10 September 1968, provides a list of protective clothing and equipment for fuel handlers.

For the POL handler and driver of a fuel servicing truck, DA Pamphlet 385-3, paragraph 4.8.2, page 104, lists: *coveralls,* safety, fire, oil resistant; *cream barrier; glasses,* safety, spectacle; *gloves,* leather, work; *shoes,* safety toe, which can be purchased using stock funds. USAAAVS is presently of the opinion that the listed clothing and equipment should give POL handlers adequate protection. If, however, the items do not provide protection or if they hamper the user when performing his duties, it is recommended that an equipment improvement recommendation (EIR) be submitted through the proper channels with an information copy forwarded to this agency.

USAASO Sez

The U. S. Army Aeronautical Services Office discusses

The first midair in the United States

FIB notices are straight and level

Would You Believe? The first midair collision in the United States occurred on 23 October 1942 when an American Airlines DC-3 and an Army B-34 collided over Palm Springs, CA, with 12 fatalities as a result. Since then, there has been an average of 34 civil aviation collisions with 69 fatalities per year in the United States. The majority of "midairs" occurs in VFR conditions around terminals and other congested areas. The best ways of avoiding a midair collision are:

- File IFR, if possible.
- Even if on an IFR flight plan, keep your head on a swivel when outside of clouds.
- If VFR, use traffic advisories of the nearest air traffic control facility and keep your head on a swivel.
- When operating near an uncontrolled civil airfield, monitor UNICOM on your VOR receiver. (Bone up on your knowledge of UNICOM by checking out chapter 4 of part I of the AIM.)

Using all of the above, Army aircraft will not be involved in the last midair.

The FIB Doesn't Fib! Some of the calls received at USAASO indicate that pilots are not using or don't have access to the U. S. Army Flight Information Bulletin (TBAVN 1-). The bulletin is published weekly by the Aeronautical Services Office to assist the aviator in flight planning. Recent examples of important notices pertain to aircraft fuel shortages engendered by the energy crisis and the fluctuation of operating hours due to personnel flux.

In the case of fuel the FAA NOTAM system won't accept fuel notices and many operators don't want to make a DOD Supplement change for what they (and we) hope is a temporary condition. The latter reason also applies to temporary changes in operating hours.

These are just two of the areas in which we try to overcome the time discrepancy between FLIP publication cycles and the requirement for a notice. For temporary conditions the FIB has been known to overcome a common aviator deficiency—"clairvoyance." FIB notices are carried until they appear in other routine planning documents or in some cases as long as the operator desires. The most recent issue of the FIB and the issue containing the facility directory should be available to the pilot in the flight planning room. These bulletins, used in conjunction with the other planning documents, give the conscientious aviator an up-to-date picture of operational capabilities at his destination.

USAASO SEZ: The wise aviator who uses all the tools available does not run out of gas on the way home!

☆ U.S. Government Printing Office 1973—746-161/5

ARMY TESTS—

Fire Retardant Delivery System

WHEN A FOREST fire occurs it does not confine itself to easily accessible areas. It often spreads to ridgelines or confined areas like valley floors. To combat fires in this type of terrain the U. S. Army Aviation Test Board, Ft. Rucker, AL, provided support to the Northern Forest Fire Laboratory, Intermountain Forest and Range Experiment Station, U. S. Department of Agriculture Forest Service at Missoula, MT, to evaluate a large helicopter fire retardant delivery system.

The system, actively tested at Apalachicola, FL, is a modification of one being used by the Forest Service on the Lockheed C-130 airplane. It was tested to determine the possibility of using it from a large helicopter and to compare its performance to that of a conventional slung bucket.

During the test 128 drops were made, half using water to establish a baseline. The other half used a fire retardant mixture with iron oxide added to color the solution, thereby aiding pilots in locating previous drops.

The drops were conducted at heights of 75, 150 and 300 feet and at airspeeds ranging from hover to 125 knots in 25-knot intervals. The flow rates from both the slung bucket and the internal system also were controlled. Ground distribution patterns, aircraft stability and performance, and the effects of rotor downwash were evaluated.

Preliminary results indicated that drop characteristics of the helicopter were superior to fixed wing aircraft because of the inherent ability of the helicopter to maneuver at low speeds.

Above: Fire retarding liquid is dropped from internal tanks of a U. S. Army Aviation Test Board CH-47C Chinook helicopter upon a measuring grid at Apalachicola, FL. The test was conducted to support the Forest Service's development of a large helicopter fire retardant delivery system. The drops were made at airspeeds ranging from a hover to 125 knots

Below left: Individual cups within the measuring grid collect the fire retardant liquid to provide quantitative and qualitative data to determine the effectiveness of the helicopter airdrop

Below right: Fire retardant material stains the grass within the grid system used to measure the retardant delivered by airdrop. It took 1,600 cups to cover an area 2,000 feet by 400 feet

USAAAVS

SAFETY 76

"I ask you to help make this program work by instilling a new measure of safety consciousness in all employees of your department or agency. As the federal establishment moves step by step toward improving our safety record, we will better not only the lives of workers on Government payrolls, but also—through the examples we set for the private sector—the lives of all Americans who work for a living."

Richard Nixon

As announced by President Nixon, "Safety'76" is a continuation of the efforts of the "Zero-In on Federal Safety" campaign to improve safety and health conditions and to obtain the greatest benefits from reduction of accidents and their resultant losses. In support of this newly launched 3-year federal campaign started in January 1974, General Creighton W. Abrams, Army Chief of Staff, has designated **June as "Take a Minute for Aviation Safety" month.** Watch for details in the May issue of the AVIATION DIGEST.